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A TECHNIQUE
FOR
DETERMINING THE RADIUS OF ACTION
FOR A
TACTICAL FIGHTER AIRCRAFT

AIRCRAFT COMPATIBILITY AND WEAPON FLIGHT DYNAMICS
BRANCH
PRODUCT ASSURANCE DIVISION

TECHNICAL REPORT AFATL-TR-73-5

JANUARY 1973

U.S.

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AIR FORCE ARMAMENT LABORATORY

AIR FORCE SYSTEMS COMMAND • UNITED STATES AIR FORCE

EGLIN AIR FORCE BASE, FLORIDA

**A Technique
for
Determining the Radius of Action
for a
Tactical Fighter Aircraft**

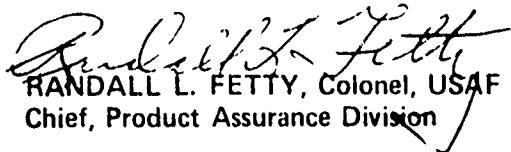
**William A. Miller, Major, USAF
Stephen C. Korn, Captain, USAF**

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FOREWORD

The work described in this report was performed between January 1971 and January 1972 as a part of Project 2567 in support of munition development programs such as the Close Air Support Weapon and the Modular Weapon Series at the Air Force Armament Laboratory, Eglin Air Force Base, Florida.

This technical report has been reviewed and is approved.


RANDALL L. FETTY, Colonel, USAF
Chief, Product Assurance Division

ABSTRACT

A computer program using an iterative technique was developed for determining the radius of action of F-4E and A-7D aircraft with any configuration of external stores. The program uses performance data from the aircraft flight manuals to calculate fuel and distance required to achieve military power climbs and optimum cruise fuel consumption. Required inputs to the program include the initial amount of fuel onboard and aircraft gross weight, the cruise and loiter altitudes, and the outbound and returning drag indicies due to aerodynamic drag of the external stores. Optional inputs that provide increased accuracy include fuel for engine start and taxi, and fuel and distance for takeoff and descent. The program calculates sequential increments of the outbound cruise portion of the mission profile until the fuel reserve desired at the end of mission (return to home base) is obtained; thus the radius of action is determined.

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SECTION I

INTRODUCTION

Carriage of external stores (weapons, fuel tanks, instrumentation packages, and suspension equipment) can result in large degradations to the range and speed performance of tactical fighter aircraft such as the F-4E and A-7D. Some weapon configurations exhibit aerodynamic drag characteristics that are as great as those of the aircraft itself; consequently, the aircraft range performance may be reduced as much as 50 percent. Therefore degradation plays a significant role in overall mission effectiveness, and the store developer must consider aerodynamic drag as an important parameter in the many trade-offs leading to the final design. This report describes a computer program developed for evaluating range performance effectiveness. The program can readily be used on a parametric basis and will provide a quantitative method of assessing the effect of aerodynamic drag on the aircraft combat radius of action.

The validity of the program results depends primarily on the accuracy of the store drag input data. Both the F-4E and A-7D aircraft utilize a drag index system based on the increment of aerodynamic drag due to external stores. Each external store authorized for carriage has a drag index assigned which included interference effects resulting from the additional drag of stores in close proximity to one another. The total drag index of a particular configuration is obtained by summing the individual drag indicies of the external stores as described in the appropriate aircraft flight manuals (e.g., References 1 and 2). Precise drag indicies cannot be determined without extensive wind tunnel tests and/or flight testing; however, good approximations for an untested store can be obtained from wind tunnel data of similar stores. References 3 and 4 describe techniques for the latter procedure, and methods for reducing wind tunnel data to obtain more accurate drag indicies may be found in Reference 5. A typical mission profile is shown in Figure 1. Performance data from the F-4E and A-7D aircraft flight manuals (References 1 and 2) are used to calculate the fuel and distance required for military power climbs and optimum cruise fuel consumption rates. Inputs to the program are the initial fuel weight and aircraft gross weight, the cruise and loiter altitudes, and the outbound and returning drag indicies of the external stores. The amount of fuel required for engine start, taxi, takeoff, and descent, as well as the distance required for takeoff and for descent, are optional inputs that can provide increased accuracy. The program calculates sequential increments of the outbound cruise portion of the mission profile until the fuel reserve desired after returning to base is obtained; thus determining the radius of action. The program can be used for any mission profile provided that the cruise portion is conducted at the optimum condition for the altitude selected and that a military power climb to altitude is assumed.

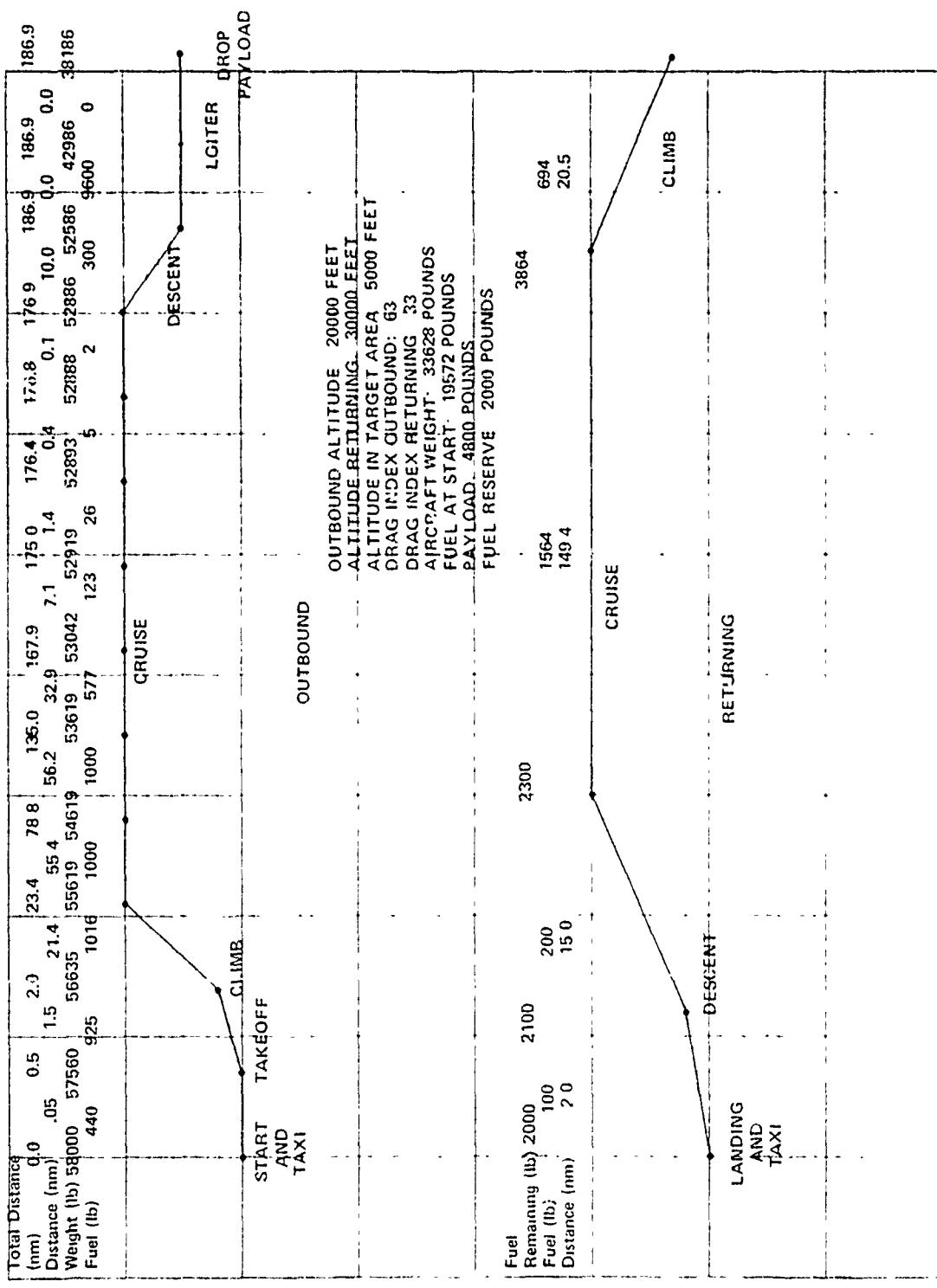


Figure 1. Final Iteration for a Typical High-Low-High Tactical Fighter Mission

SECTION II

DEVELOPMENT OF THE ITERATIVE TECHNIQUE

The fuel and distance required for the climb and cruise portions of the mission are highly dependent upon the outbound and returning altitudes and drag indices; however, the fuel and distance for engine start, taxi, and takeoff are independent of these parameters. Also, a good approximation for descent from any altitude for any drag index is that the fuel expended and the distance traveled are both zero. Therefore, for parametric studies, engine start, taxi, takeoff, and descent can be considered as constants. Guide lines for obtaining accurate estimates for these portions of the mission are contained in the aircraft flight manuals. The program is designed to accept the following estimates as input data:

- a. Fuel and distance traveled away from home base for start and taxi.
- b. Fuel and distance traveled away from home base for takeoff.
- c. Fuel and distance traveled away from home base for outbound descent.
- d. Fuel and distance traveled away from target for descent returning.
- e. Fuel and distance traveled away from home base during loiter in target area.

Additional required program inputs are as follows:

- a. Aircraft type.
- b. Altitude outbound in the target area, and returning.
- c. Fuel at engine start.
- d. Payload (any weight which might be dropped, ejected, or jettisoned during mission).
- e. Basic aircraft weight (gross weight minus fuel and payload).
- f. Fuel reserve at end of mission.
- g. Payload not dropped, ejected, or jettisoned during mission.
- h. Drag index outbound and returning.

The drag indices outbound and returning from the target area should be determined by the best available means.

For each set of input data, radii of action are determined for loiter fuels of 9600 pounds down to 0 in increments of 1200 pounds. Obviously, the amount of fuel available for loiter can be used to approximate a permissible loiter time.

If the altitude in the target area is greater than zero but less than 5000 feet, the program automatically changes to either zero or 5000 feet based upon the magnitude of the input value. This conversion is necessary because the subroutines are unable to determine accurate values for this range of altitudes.

Further, if the aircraft gross weight at engine start exceeds that allowable for the aircraft, fuel is downloaded automatically in the program to the point where the gross weight is within allowable limits.

The weight and distance traveled away from home base is determined by subtracting all fuel used and adding all distances traveled. Subroutines are then called which provide the fuel and distance required to climb to the outbound altitude; at that time new weight and distance values are determined and retained. If this is followed by a cruise, it will be a 1000-pound-fuel cruise, and the gross weight at the beginning of the cruise will be used. The estimated subsequent fuel requirements determine whether a 1000-pound-fuel cruise is undertaken. Another subroutine provides the fuel consumption rate. After the outbound climb or the 1000-pound-fuel cruise, as the case may be, the outbound descent is made, a 9600-pound-fuel loiter is completed; all, none, or some portion of the payload is dropped; and the return trip home is begun after the distance from home base to the target is noted.

Each of the climb subroutines is called twice to determine the fuel and distance required to proceed from target altitude to the return altitude. The amount required to climb from sea level to the target altitude is subtracted from the amount required to climb from sea level to the return altitude.

After the return climb is completed, the cruise subroutine is called to determine a fuel consumption rate for the beginning of the return cruise. With the fuel data for the return descent and for landing and taxi, the desired gross weight at the end of the return cruise and the fuel consumption rate at this point are known. The same distance data, the return climb distance, and the distance from home base to the target, are used to calculate the return cruise distance. The fuel consumption rates are averaged, and the fuel required for the return cruise is computed.

The trial mission is completed and the extra fuel determined. If the extra fuel is less than minus one pound, the mission can not be completed for the specified loiter fuel, and another simulated mission is attempted with 1200 pounds less fuel for loiter. If the extra fuel amounts to one pound or more, either one-half, one-third, or 1000 pounds of it are used for a cruise or an additional outbound cruise to the target area. The appropriate quantity to be used is determined by the relation of the outbound and returning drag indices combined with the amount of extra fuel. The iteration is repeated using either the weight and distance after the outbound climb or the weight and distance after the last outbound cruise, if one has occurred, until the mission is completed with the desired quantity of extra fuel (zero or minus one pound). Thus, the radius of action has been determined.

Subsequent radii are determined for loiter fuels incremented by minus 1200 pounds until the fuel for loiter has been reduced to zero pounds. Instead of simulating the new mission from the very beginning, the new iteration is begun after the outbound climb or the last 1000-pound-fuel cruise, if one has occurred.

Appendices I, II, and III contain the radius-of-action program listing, input list, and limitations, respectively.

SECTION III

DEVELOPMENT OF THE SUBROUTINES

This section discusses the development of the subroutines for calculating the fuel and distance required to climb and the fuel consumption rate, given the aircraft type, altitude, gross weight, and drag index.

The F-4E and A-7D aircraft climb and cruise parameters are displayed in figures contained in the aircraft flight manuals (References 1 and 2). These figures define the fuel consumption rate for optimum cruise, fuel required to climb, and distance required to climb. These figures are set up in a parametric format and are a function of aircraft gross weight, altitude, drag index, and a parametric variable (designated as T in this report). Each figure is divided into two charts with the first chart being a family of curves that are a function of gross weight and altitude which define the dependent variable T. The second chart has a family of curves with independent variables of T and aircraft drag index and with a dependent variable of either fuel for climb, distance for climb, or fuel consumption rate for optimum cruise depending upon which figure is being used. Although no equations define the families of curves, a method was developed to define the families for computer applications. The first chart contains discrete curves which are a function of gross weight, for altitudes of 0, 5000, 1000, . . . , and 40,000 feet. Similarly, the second chart contains discrete curves for drag indices of zero to the maximum in specified increments that are a function of T. The problem then was to find equations of lines for any condition other than those discretely defined. The method used was a Newtonian interpretation technique (Reference 6) that defines an n^{th} order polynomial for n discrete points. The development of the Newtonian equation by this method forces the polynomial to satisfy the n discrete points by definition. The equation then can be used to calculate a value between any of the discrete points.

It was hypothesized that if a family of straight parametric lines was only defined at discrete values, the slope and intercept of any line lying between two defined lines could be determined by interpolation of the defined values. Although the family of curves did not consist of straight lines, the values were approximated by decomposing the curves into a number of straight lines. In the first chart, the curves that are a function of gross weight and altitude are drawn as straight lines between certain gross weights. Similarly in the second chart, the curves that are a function of T and drag index are drawn as straight lines between certain values of T. Now using the Newtonian method, two equations are defined to give the slope and intercept for any altitude line in the first chart. Similarly, two equations are defined that provide the slope and intercept for any drag index line in the second chart. Thus, when the altitude is defined, a linear equation which has gross weight as the independent variable and T as the dependent variable, is constructed with a calculated slope and intercept. When a drag index is defined, another linear equation, which has T as the independent variable and either fuel for climb, distance for climb, or fuel for cruise as the dependent variable, is constructed with a calculated slope and intercept.

Three computer subroutines were constructed to incorporate the method just described. One subroutine will construct the equations for determining the fuel for climb, a second subroutine will give the equation for distance to climb, and a third subroutine is concerned with the fuel consumption rate for optimum cruise.

Appendices IV and V contain the main programs and two additional subroutines for utilizing the three radius-of-action subroutines to obtain tabular data for the following independent variables:

a. F-4E (see Appendix VI)

- (1) Altitude (5000 to 40000 feet in increments of 2500 feet).
- (2) Weight (30000 to 58000 pounds in increments of 1000 pounds).
- (3) Drag index (0 to 140 in increments of 10).

b. A-7D

- (1) Altitude (5000 to 40000 feet in increments of 2500 feet).
- (2) Weight (20000 to 42000 pounds in increments of 1000 pounds).
- (3) Drag index (0 to 300 in increments of 20).

SECTION IV

APPLICATION OF THE TECHNIQUE

As an example, assume that the radius of action for an F-4E aircraft is to be determined for a high-low-high mission at altitudes of 20000 feet outbound, 5000 feet in the target area (loiter), and 30,000 feet returning. Further, assume some realistic values for the mission segments (Figure 1) as follows:

	Fuel, lb	Distance, N. M.
Start and Taxi	440	0.5
Takeoff	925	1.5
Descent going to target	300	10.0
Descent returning from target	200	15.0
Landing and taxi	100	2.0
Loiter	N/A	0.0

Also, assume that the payload is six 800-pound weapons; all of which are to be dropped from the triple ejector rack on the inboard armament stations. A typical fuel reserve at the end of a mission is 2000 pounds.

The aircraft incremental drag as a result of weapon carriage (weapon drag index) is largely dependent upon weapon shape and diameter and can conceivably vary from a total weapon drag index of 30 to 60. Figure 2 shows the radius of action as a function of loiter fuel for two weapon drag indicies and three fuel loadings. Note that when fuel was carried on the centerline and outboard stations with the large payload, 1198 pounds had to be downloaded so as not to exceed the maximum gross weight of 58000 pounds. This makes the increase in the radius of action based on outboard and centerline fuel somewhat less than if the payload was less.

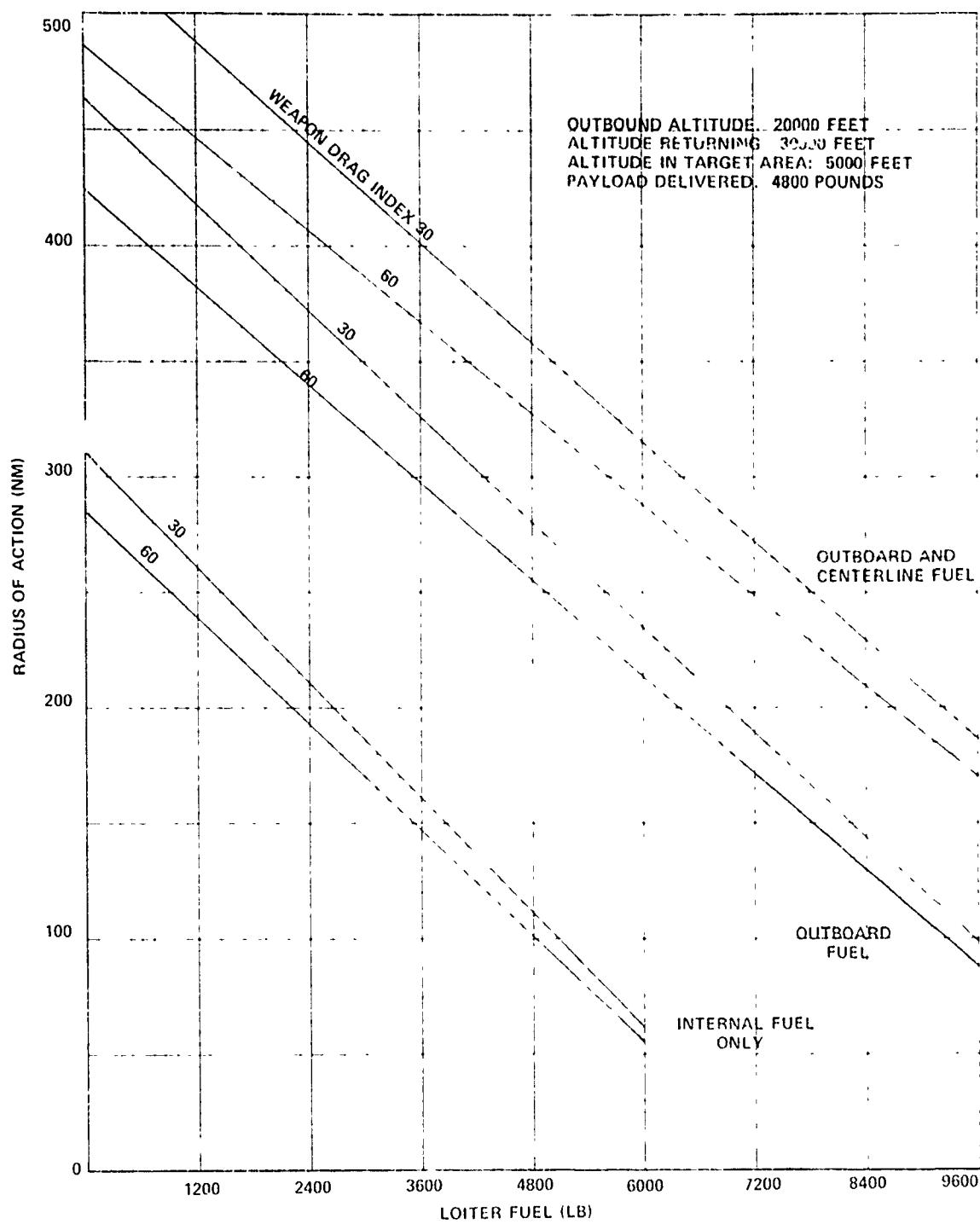


Figure 2. Radius of Action Versus Loiter Fuel for Two Weapon Drag Indices and Three Fuel Loadings

APPENDIX I
RADIUS OF ACTION PROGRAM LISTING

```

PROGRAM P3700(INPUT,OUTPUT,TAPE5=INPUT)
DIMENSION DACR(100),DTT(100)
INTEGER BAH,F,FAS,FFCL,FFCR,FFDG,FFDR,FFL,FFLAT,FFSAT,FFT0,FTBR,P,
1PE,PR,W,WACR(100),WAEOCR,XFFCR,WALBCR,XF,FFCL1,FFCL2,C
801  FORMAT(A10,3F5.0,54X,I1)
COMMON/CACFT/F4E,A7D
802  FORMAT(8A10)
803  FORMAT(3I4,4X,4I4,2F3.0,2X,2I5,I6,6F4.0)
901  FORMAT(31X,2(I6,4X),3X, I3, 5X,E( F6.1,4X),/,1X,5(I6,4X),3X, I3
1,5X,7(I6,4X),/)
902  FORMAT(1H1,42X,4HFUEL,/,32X,7HPAYLCAD,2X,8HRETURNED,5X,4HDrag,5X,5
1HSTART,2(13X,7HDESCENT),4X,7HLANDING,/,2X,5HBASIC,5X,5HTOTAL,14X,8
2HRETURNED,1X,10HPROGRAMMED,3X,5HINDEX,3X,8HAND TAXI,2X,8HTAKE-OFF,
33X,5HGOING,5X,6HLOITER,2X,9HRETURNING,2X,8HAND TAXI,4X,6HRADIUS,/,
42X,4HACFT,6X,4HFUEL,5X,7HPAYLOAD,3X,8HEXPENDED,3X,6HACTUAL,3X,9HRE
5TURNING,4X,2HNM,5(8X,2HNM),5X,9HCF ACTION,/,1X,2(6HWT(LB),4X),1X,3
6(6HWT(LB),4X),1X,5HGOING,6(4X,6HWT(LB)),7X,2HNM,/)
903  FORMAT(51X,*CHECK THE INPUT DATA FOR THIS CASE.*,/)
904  FORMAT(///,24X,*THIS PROGRAM DOES NOT PRESENTLY HAVE REQUIRED INFO
1PMATION FOR THE *,A10,* AIRCRAFT.*)
905  FORMAT(///,47X,*ALL ALTITUDES MUST BE SEA LEVEL OR ABOVE.*)
906  FORMAT(///,31X,*AN ALTITUDE OF *, I5 ,* FEET EXCEEDS THE TABLES F
10R THE *,A10,* AIRCRAFT.*)
907  FORMAT(29X,*A GROSS WEIGHT OF *,I5,* POUNDS EXCEEDS THE TABLES FOR
1 THE *,A10,* AIRCRAFT.*,/)
908  FORMAT(34X,*A DRAG INDEX OF *, I4 ,* EXCEEDS THE TABLES FOR THE *
1,A10,* AIRCRAFT.*,/)
909  FORMAT(1H1,55X,*RADUIS OF ACTION FOR THE*,//,59X,A10,*AIRCRAFT*,//,
1,49X,*ALTITUDE GOING TO THE TARGET*, I5, * FEET*,//,46X,*ALTITUD
2E RETURNING FROM THE TARGET*,I5, * FEET*,//,50X,*ALTITUDE AT THE
3 TARGET*,I5, * FEET*)
910  FORMAT(1X,*A GROSS WEIGHT OF *,I6,* POUNDS AND A DRAG INDEX OF *,
1I3,* AND AN ALTITUDE OF *,I5,* FEET EXCEED THE TABLES FOR THE *,
2A10,* AIRCRAFT.*,/)
911  FORMAT(31X,2(I6,4X),2X, F4.0,5X,6( F6.1,4X),/,1X,5(I6,4X),2X, F4.0
1,5X,6(I6,4X))
912  FORMAT(31X,2(I6,4X),3X, I3, 5X,E( F6.1,4X),/,1X,5(I6,4X),3X, I3
1,5X,7(I6,4X),/,1H1)
913  FORMAT(1X, 42X,4HFUEL,/,32X,7HPAYLOAD,2X,8HRETURNED,5X,4HDrag,5X,5
1HSTART,2(13X,7HDESCENT),4X,7HLANDING,/,2X,5HBASIC,5X,5HTOTAL,14X,8
2HRETURNED,1X,10HPROGRAMMED,3X,5HINDEX,3X,8HAND TAXI,2X,8HTAKE-OFF,
33X,5HGOING,5X,6HLOITER,2X,9HRETURNING,2X,8HAND TAXI,4X,6HRADIUS,/,
42X,4HACFT,6X,4HFUEL,5X,7HPAYLOAD,3X,8HEXPENDED,3X,6HACTUAL,3X,9HRE
5TURNING,4X,2HNM,5(8X,2HNM),5X,9HCF ACTION,/,1X,2(6HWT(LB),4X),1X,3
6(6HWT(LB),4X),1X,5HGOING,6(4X,6HWT(LB)),7X,2HNM,/)
914  FORMAT(1H1,*ALL WEIGHTS ARE IN POUNDS. ALL DISTANCES ARE IN NAUTI
1CAL MILES. ALL FUEL CONSUMPTION RATES EXCEPT THE AVERAGES ARE NAU
2TICAL MILES PER*,/,
31X,*POUND. AVERAGES ARE POUNDS PER NAUTICAL MILE.*////////,
41X,*WEIGHT AT THE END OF RETURN CRUISE=*,I6,* FUEL RATE=*,F5.4,//,
5*)
915  FORMAT(1X,*FOR CLIMB GOING TO THE TARGET      WEIGHT=*,I6,* FUEL=*
1,I4,* DISTANCE=*,F7.4,/)
916  FORMAT(1X,*FOR CRUISE NUMBER*,I3,* GOING TO THE TARGET      WEIGHT=
1*,I6,/,)

```

```

11X,*FUEL RATE=*,F5.4,* TOTAL DISTANCE TRAVELED AFTER THIS CRUISE=
2*,F8.4,/)

917 FORMAT(1X,*FOR CLIMA RETURNING FROM THE TARGET WEIGHT=*,I6,/,
16X*FROM 0 FEET TO RETURN ALTITUDE FUEL=*I4* DISTANCE=*,F7.4/
16X*FRCM 0 FEET TO TARGET ALTITUDE FUEL=*I4* DISTANCE=*,F7.4/
16X*FROM TARGET TO RETURN ALTITUDE FUEL=*I4* DISTANCE=*,F7.4/
1)

918 FORMAT (1X,*WEIGHT AT BEGINNING OF RETURN CRUISE=*,I6,* FUEL RATE
1 AT THIS POINT=*,F5.4,* AVERAGE RATE=*,F8.4,/;
21X,*DISTANCE FOR RETURN CRUISE=*,F8.4,* FUEL AT END OF MISSION=*,  

3I5,* EXTRA FUEL AT END OF MISSION=*,I5,///)

919 FORMAT(1X,*FOR CRUISE NUMBER*,I3,* GCING TO THE TARGET WEIGHT=
1*,I6,/,
11X,*FUEL RATE=*,F5.4,* EXTRA FUEL FOR CRUISE GOING=*,I5,* TOTAL
2DISTANCE TRAVELED AFTER THIS CRUISE=*,F8.4,/)>

10 ASSIGN 212 TO IEOF
CALLECF(IEOF)
F4E=10HF4E
A7D=10HA7D
READ(5,801) ACFT,ALTG,ALTR,ALTAT,C
IF(ALTAT.LE.2500..AND.ALTAT.GT. 0.) ALTAT=0.
IF(ALTAT.LT.5000..AND.ALTAT.GT.2500.) ALTAT=5000.
ILTG=ALTG
ILTR=ALTR
ILTA=ALTAT
PRINT 909, ACFT,ILTG,ILTR,ILTA
IF(ALTG.LT.0..OR.ALTR.LT.0..OR.ALTAT.LT.0.) GO TO 202
ILT=ALTG
IF(ALTG.LT.5000.) GO TO 203
ILT=ALTR
IF(ALTR.LT.5000.) GO TO 203
ILT=ALTG
IF(ALTR.GT.ILT ) ILT=ALTR
IF(ACFT.EQ.F4E.AND.ILT.GT.40000.) GO TO 203
IF(ACFT.EQ.A7D.AND.(ILT.GT.40000.OR.ILT.LT.5000)) GO TO 203
IF(ACFT.FQ.F4E.OR.ACFT.EQ.A7D) GO TO 40
20 PRINT 904,ACFT
21 ASSIGN 211 TO IEOF
DO 30 I=1,10000
30 READ(5,802) A
GO TO 212
40 ASSIGN 211 TO IEOF
50 IF(C.NE.1) PRINT 902
DO 200 IP=1,2
READ(5,803) FFSAT,FFTO,FFDG, FFOR,FFLAT,FTBR,PR,DIG,DIR,
1FAS,P,BAW,DFSAT,DFTO,DFDG,DFL,DFCR,DFLAT
ICR=DIP
IDG=DIG
FFL=9600
H=BAW+FAS+P
IF(ACFT.EQ.F4E.AND.H.GT.58000) FAS=58000-BAW-P
IF(ACFT.EQ.A7D.AND.H.GT.42000) FAS=42000-BAW-P
IF(FFSAT .LT.0) GO TO 201
IF(FFTO .LT.0) GO TO 201
IF(FFDG .LT.0) GO TO 201

```

```

IF(FFCR .LT.0) GO TO 201
IF(FFLAT .LT.0) GO TO 201
IF(FTBR .LT.0) GO TO 201
IF(FAS .LE.0) GO TO 201
IF(PR .LT.0) GO TO 201
IF(P .LT.0) GO TO 201
IF(BAH .LE.0) GO TO 201
IF(FAS.LF.(FFSAT+FFT0+FFDG+FFDR+FFLAT+FTBR)) GO TO 201
IF(PR.GT.P) GO TO 201
PE=P-PR
J=2
ID=DIG
IF(DIR.LT.ID) ID=DIR
IF(ID.LT.0.) GO TO 205
ID=DIG
IF(DIR.GT.ID) ID=DIR
IF(ACFT.EQ.F4E.AND.ID.GT.140 ) GO TO 205
IF(ACFT.EQ.A7D.AND.ID.GT.300 ) GO TO 205
IF(DIR.GT.DIG) J=3
XJ=!
JPM=J*1000
HAEOCR=BAH+PR+FTBR+FFLAT+FFDR
IF(ACFT.EQ.F4E.AND.HAEOCR.LT.30000) GO TO 210
IF(ACFT.EQ.A7D.AND.HAEOCR.LT.20000) GO TO 210
W=BAH+FAS+P
W=W-FFSAT-FFT0
ILT=ALTR
ID=DIR
CALL CLD(ACFT,ALTR,HAEOCR,DIR,FRE), RETURNS(207)
ILT=ALTG
ID=DIG
CALL CRD(ACFT,ALTR,HAEOCR,DIR,FRE)
IF(C.EQ.1) PRINT 914, HAEOCR,FRE
D=DFSAT+DFTO
CALL CLF(ACFT,ALTG,W,DIG,FFCL)
CALL CLD(ACFT,ALTG,W,DIG,DFCL ), RETURNS(207)
IFFCL=FFCL
IF(C.EQ.1) PRINT 915, W,FFCL ,DFCL
W=W-FFCL
D=D+DFCL
I=2
IMO=I-1
WACR(1)=W
DAGR(1)=0
IA=I
NFFCR=3001
NOI=9
DO 199 IFFL=1,NOI
IF((FAS-FFSAT-FFT0-2*IFFCL-FFDG-FFL-FFDR-FFLAT-FTBR).LT.JBM ) GO T
10 101
IF(NFFCR.LT.1000) GO TO 101
I=IA
IMO=I-1
100 CALL CRD(ACFT,ALTG,WACR(IMO),DIG,DFCR)
WACR(I)=WACR(IMO)-1000

```

```

DACR(I)=DACR(IM0)+DFCR*1000.
IF(C.EQ.1) PRINT 916, IM0,WACR(IM0),DFCR,DACR(I)
HALRCR=WACR(I)
DALRCR=DACR(I)
I=I+1
IA=I
IMO=I-1
101 W=WACR(IM0)-FFDG-FFL-PE
DTT(IMC)=DACR(IM0)+DFDG+DFL
CALL CLF(ACFT,ALTR,W,DIR,FFCL2)
CALL CLF(ACFT,ALTAT,W,DIR,FFCL1)
CALL CLD(ACFT,ALTR,W,DIR,DFCL2), RETURNS(207)
CALL CLD(ACFT,ALTAT,W,DIR,DFCL1),RETURNS(207)
FFCL=FFCL2-FFCL1
DFCL=DFCL2-DFCL1
IF(C.EQ.1) PRINT 917, W,FFCL2,DFCL2,FFCL1,DFCL,FFCL
W=W-FFCL
DFCR=DTT(IM0)-DFCL-DFDR-DFLAT
CALL CFD(ACFT,ALTR,W,DIR,FRB)
FRFCR=2./(FRE+FRB)
FFCR=FFFCR*DFCR+.5
F=W-BAW-PR-FFCR-FFDR-FFLAT
XF=F-FTBR
IF(C.EQ.1) PRINT 918, W,FRB,FRFCR,DFCR,F,XF
XFFCR=XF/XJ+.5
IF(XFFCR.GE.1000) GO TO 100
IF(XFFCR.LT.-1) FFL=FFL-1200
IF(FFL.LT.0) GO TO 200
IF(XFFCR.LT.-1) GO TO 101
IF(XFFCR.LT.1) GO TO 198
NFFCR=XFFCR+1200/J
102 CALL CRD(ACFT,ALTG,WACR(IM0),DIG,FR)
WACR(I)=WACR(IM0)-XFFCR
DACR(I)=DACR(IM0)+FR*XFFCR
IF(C.EQ.1) PRINT 919, IM0,WACR(IM0),FR,XFFCR,DACR(I)
I=I+1
IMO=I-1
W=WACR(IM0)-FFDG-FFL-PE
DTT(IMC)=DACR(IMC)+DFDG+DFL
CALL CLF(ACFT,ALTR,W,DIR,FFCL2)
CALL CLF(ACFT,ALTAT,W,DIR,FFCL1)
CALL CLD(ACFT,ALTR,W,DIR,DFCL2), RETURNS(207)
CALL CLD(ACFT,ALTAT,W,DIR,DFCL1),RETURNS(207)
FFCL=FFCL2-FFCL1
DFCL=DFCL2-DFCL1
IF(C.EQ.1) PRINT 917, W,FFCL2,DFCL2,FFCL1,DFCL,FFCL
W=W-FFCL
DFCR=DTT(IM0)-DFCL-DFDR-DFLAT
CALL CRD(ACFT,ALTR,W,DIR,FRB)
FRFCR=2./(FRE+FRB)
FFCR=FRFCR*DFCR+.5
F=W-BAW-PR-FFCR-FFDR-FFLAT
XF=F-FTBR
IF(C.EQ.1) PRINT 918, W,FRB,FRFCR,DFCR,F,XF
XFFCR=XF/XJ+.5

```

```
198 IF(XFFCR.GT.0) GO TO 102
      IDT=DTT(IMO)+.5
      IF(C.EQ.1) PRINT 913
      IF(C.NE.1) PRINT 901, PR,FTBR,DIR,DFSAT,DFT0,DFDG,DFL,DFDR,DFLAT,B
      1AH,FAS,P,PE,F,IDG,FFSAT,FFT0,FFDG,FFL,FFDR,FFLAT,IDL
      IF(C.EQ.1) PRINT 912, PR,FTBR,DIR,DFSAT,DFT0,DFDG,DFL,DFDR,DFLAT,B
      1AH,FAS,P,PE,F,IDG,FFSAT,FFT0,FFDG,FFL,FFDR,FFLAT,IDL
      FFL=FFL-1200
      IF(FFL.LT.0) GO TO 200
      I=IA
      IMO=I-1
199  CONTINUE
200  CONTINUE
      GO TO 50
201  CONTINUE
      PRINT 911, PR,FTBR,DIR,DFSAT,DFT0,DFDG,DFL,DFDR,DFLAT,BAH,FAS,P,PE
      1,F,DIG,FFSAT,FFT0,FFDG,FFL,FFDR,FFLAT
      PRINT 903
      GO TO 200
202  PRINT 905
      GO TO 21
203  PRINT 906, ILT, ACFT
      GO TO 21
204  H=4HFFCL
      PRINT 907, ALT,W,H,ACFT
      GO TO 200
205  PRINT 908, ID, ACFT
      GO TO 200
207  PRINT 910, W, ID, ILT, ACFT
      GO TO 200
210  PRINT 907, W, ACFT
      GO TO 200
211  GO TO 10
212  CALL EXIT
      END
```

```

SUBROUTINE CLD(ACFT,ALT, W,DI,DIS),      RETURNS(A)
DIMENSION DY5(10),DY6(10),DY7(10),DY8(10),DY9(10),DY10(10),DY11(10)
1),DY12(10),DY13(10),DY14(10),DY15(10),CY11(10),CY12(10),CY13(10),C
2Y14(10),CY15(10),CY16(10),CY16(10),DY17(10),CY17(10)
COMMON/CACFT/F4E,A7D
INTEGER W
GW=W/1000.
DIS=0.
IF(ACFT.EQ.F4E ) GO TO 1
IF(ACFT.EQ.A7D ) GO TO 2
1   OGW=30.
DY11(1)=.013
DY11(2)=.001
DY11(3)=.008
DY11(4)=-.023
DY11(5)=.061
DY11(6)=-.121
DY11(7)=.179
DY11(8)=-.18
DY12(1)=.013
DY12(2)=.001
DY12(3)=.008
DY12(4)=-.023
DY12(5)=.061
DY12(6)=-.121
DY12(7)=.179
DY12(8)=-.0
DY13(1)=.013
CY13(2)=.001
DY13(3)=.008
DY13(4)=-.023
DY13(5)=.061
DY13(6)=-.121
DY13(7)=.222
DY13(8)=-.051
DY14(1)=.02
DY14(2)=.012
DY14(3)=-.027
DY14(4)=.037
DY14(5)=-.005
DY14(6)=-.090
DY14(7)=.293
DY14(8)=-.195
DY15(1)=.02
DY15(2)=.012
CY15(3)=-.027
DY15(4)=.037
DY15(5)=-.005
DY15(6)=-.090
DY15(7)=.495
DY15(8)=-1.81
DY16(1)=.035
DY16(2)=-.008
UY16(3)=-.001
DY16(4)=.005

```

DY16(5)=.045
DY16(6)=-.175
DY16(7)=.881
DY16(8)=-4.095
DY17(1)=.046
DY17(2)=-.03
DY17(3)=.032
DY17(4)=-.039
DY17(5)=.1
DY17(6)=-.141
DY17(7)=.258
DY17(8)=-1.383
CY11(1)=.4
CY11(2)=.05
CY11(3)=.05
CY11(4)=-.01
CY11(5)=-.36
CY11(6)=1.310
CY11(7)=-2.76
CY11(8)=4.710
CY12(1)=.4
CY12(2)=.05
CY12(3)=.05
CY12(4)=-.01
CY12(5)=-.36
CY12(6)=1.31
CY12(7)=-2.76
CY12(8)=4.01
CY13(1)=.4
CY13(2)=.05
CY13(3)=.05
CY13(4)=-.01
CY13(5)=-.36
CY13(6)=1.31
CY13(7)=-3.18
CY13(8)=4.72
CY14(1)=.35
CY14(2)=.05
CY14(3)=-.01
CY14(4)=.24
CY14(5)=-1.06
CY14(6)=2.51
CY14(7)=-3.98
CY14(8)=.03
CY15(1)=.210
CY15(2)=.330
CY15(3)=-.43
CY15(4)=.8
CY15(5)=-1.76
CY15(6)=3.35
CY15(7)=-8.54
CY15(8)=29.79
CY16(1)=-.2
CY16(2)=.7
CY16(3)=-.85

CY16(4)=1.35
CY16(5)=-2.75
CY16(6)=5.15
CY16(7)=-17.9
CY16(8)=87.65
CY17(1)=-.4
CY17(2)=1.1
CY17(3)=-1.45
CY17(4)=2.15
CY17(5)=-3.75
CY17(6)=3.17
CY17(7)=2.96
CY17(8)=.21
DY7(1)=0.0
DY7(2)=0.0
DY7(3)=1.
DY7(4)=-3.
DY7(5)=6.5
DY7(6)=-12.
DY7(7)=20.5
DY8(1)=1.
DY8(2)=0.0
DY8(3)=-1.
DY8(4)=4.
DY8(5)=-10.
DY8(6)=21.
DY8(7)=-41.
DY9(1)=1.
DY9(2)=0.0
DY9(3)=1.5
DY9(4)=-2.5
DY9(5)=1.5
DY9(6)=2.5
DY9(7)=-6.
DY10(1)=1.
DY10(2)=2.
DY10(3)=-2.
DY10(4)=2.
DY10(5)=-3.
DY10(6)=5.
DY10(7)=-4.
SL1=0.0
CONST1=0.0
SL2=4.
SL3=4.
SL4=5.
SL5=5.
KK1=8
KK2=7
DX1=2.
DX2=4.
DX3=6.
DDI=20.
GO TO 200
2 DGH=20.

DY5(1)=.02
DY5(2)=0.0
DY5(3)=0.0
DY5(4)=0.0
DY5(5)=.04
DY5(6)=-.17
DY5(7)=.54
DY5(8)=-1.53
DY6(1)=.25
DY6(2)=.15
DY6(3)=-.30
DY6(4)=.55
DY6(5)=-.85
DY6(6)=1.45
DY6(7)=-2.5
DY6(8)=4.25
DY7(1)=2.0
DY7(2)=0.0
DY7(3)=-1.5
DY7(4)=3.5
DY7(5)=-5.75
DY7(6)=8.
DY8(1)=2.0
DY8(2)=1.5
DY8(3)=-1.
DY8(4)=4.5
DY8(5)=-5.
DY8(6)=-4.5
DY9(1)=2.
DY9(2)=3.5
DY9(3)=5.
DY9(4)=-13.5
DY9(5)=44.
DY9(6)=-118.5
DY10(1)=2.
DY10(2)=11.5
DY10(3)=-13.
DY10(4)=18.5
DY10(5)=44.
DY10(6)=-118.5
CONST1=.15
SL1=.01
SL2=12.5
SL3=12.5
SL4=12.5
SL5=12.5
KK1=8
KK2=6
DX1=2.
DX2=2.5
DX3=3.
DDI=50.
GO TO 13
200 IF(GH.GT.35.) GO TO 3
KK1=8

```

DO 100 I=1,KK1
DY5(I)=DY11(I)
100 DY6(I)=CY11(I)
GO TO 13
3 IF(GW.GT.40.) GO TO 4
KK1=8
DO 101 I=1,KK1
DY5(I)=DY12(I)
101 DY6(I)=CY12(I)
GO TO 13
4 IF(GW.GT.45.) GO TO 5
KK1=8
DO 102 I=1,KK1
DY5(I)=DY13(I)
102 DY6(I)=CY13(I)
GO TO 13
5 IF(GW.GT.50.) GO TO 6
KK1=8
DO 103 I=1,KK1
DY5(I)=DY14(I)
103 DY6(I)=CY14(I)
GO TO 13
6 IF(GW.GT.55.) GO TO 7
KK1=8
DO 104 I=1,KK1
DY5(I)=DY15(I)
104 DY6(I)=CY15(I)
GO TO 13
7 IF(GW.GT.60.) GO TO 8
KK1=8
DO 105 I=1,KK1
DY5(I)=DY16(I)
105 DY6(I)=CY16(I)
GO TO 13
8 KK1=8
DO 106 I=1,KK1
DY5(I)=DY17(I)
106 DY6(I)=CY17(I)
13 CO=1.
U=ALT/5000.
IF(ACFT.EQ.A7D) U=U-1.
DO 700 I=1,KK1
CO=CO*U/FLOAT(I)
U=U-1.
SL1=DY5(I)*CO+SL1
700 CONST1=DY6(I)*CO +CONST1
T=SL1*(GW-DGW) +CONST1
IF(ACFT.EQ.F4E.AND.(T.LT.0..OR.T.GT.12.4)) RETURN A
IF(ACFT.EQ.A7D.AND.(T.LT.0..OR.T.GT.5.75)) RETURN A
CO =1.
U=DI/DDI
DO 701 I=1,KK2
CO=U*CC/FLOAT(I)
U=U-1.
701 SL2=DY7(I)*CO +SL2

```

```

R=T*SL2
IF(T.LE.DX1) GO TO 801
CO =1.
U=DI/DOI
DO 702 I=1,KK2
CO=CO*U/FLOAT(I)
U=U-1.
702 SL3=DY8(I)*CO+SL3
R=SL2*CX1+SL3*(T-DX1)
IF(T.LE.DX2) GO TO 801
CO=1.
U=DI/COI
DO 703 I=1,KK2
CO=CO*U/FLOAT(I)
U=U-1.
703 SL4=DY9(I)*CO+SL4
R=SL2*DX1 +SL3*(DX2-DX1) +SL4*( T-DX2)
IF(T.LE.DX3) GO TO 801
CO=1.
U=DI/DOI
DO 704 I=1,KK2
CO=CO*U/FLOAT(I)
U=U-1.
704 SL5=DY10(I)*CO + SL5
R=SL2*DX1 +SL3*(DX2-DX1) +SL4*(DX3 -DX2) +SL5*(T-DX3)
801 IF(ACFT.EQ.F4E.AND.R.GT.74.) RETURN A
IF(ACFT.EQ.F4E.AND.R.GT.(-7.27*T+148.2)) RETURN A
IF(ACFT.EQ.A7D.AND.R.GT.100.) RETURN A
803 DIS=R
GW=GW*1000.
300 RETURN
END

```

```

SUBROUTINE CLF(ACFT,ALT, W,DI,FUEL)
DIMENSION DY5(10),DY6(10),DY7(10),DY8(10),DY9(10),DY11(10),DY12(10)
1),DY13(10),DY14(10),DY15(10),CY11(10),CY12(10),CY13(10),CY14(10),C
2Y15(10),DY16(10),CY16(10),DY17(10),CY17(10)
COMMON/CACFT/F4E,A7D
INTEGER W,FUEL
GW=W/1000.
FUEL=0.
IF(ACFT.EQ.F4E ) GO TO 1
IF(ACFT.EQ.A7D ) GO TO 2
1 DGW=30.
DY11(1)=.013
DY11(2)=.002
DY11(3)=-.005
DY11(4)=.021
DY11(5)=-.06
DY11(6)=.137
DY11(7)=-.267
DY11(8)=.466
DY12(1)=.013
DY12(2)=.002
CY12(3)=-.005
DY12(4)=.021
DY12(5)=-.06
DY12(6)=.137
DY12(7)=-.267
DY12(8)=.505
DY13(1)=.013
DY13(2)=.002
DY13(3)=.007
DY13(4)=-.027
DY13(5)=.072
DY13(6)=-.154
DY13(7)=.287
DY13(8)=-.338
DY14(1)=.020
CY14(2)=-.002
DY14(3)=-.002
DY14(4)=.014
DY14(5)=-.038
DY14(6)=.089
DY14(7)=-.173
DY14(8)=.388
DY15(1)=.02
DY15(2)=-.002
DY15(3)=.009
DY15(4)=-.030
DY15(5)=.094
CY15(6)=-.242
DY15(7)=.601
DY15(8)=-1.46
DY16(1)=.022
DY16(2)=.001
CY16(3)=-.006
DY16(4)=.016

```

DY16(5)=-.026
DY16(6)=.059
DY16(7)=-.148
DY16(8)=.340
DY17(1)=.022
DY17(2)=.001
DY17(3)=.005
DY17(4)=-.028
DY17(5)=.1000
DY17(6)=-.197
DY17(7)=.153
DY17(8)=.508
CY11(1)=.530
CY11(2)=-.08
CY11(3)=.04
CY11(4)=.08
CY11(5)=-.45
CY11(6)=1.32
CY11(7)=-2.94
CY11(8)=5.42
CY12(1)=.53
CY12(2)=-.08
CY12(3)=.04
CY12(4)=.08
CY12(5)=-.45
CY12(6)=1.32
CY12(7)=-2.94
CY12(8)=5.27
CY13(1)=.530
CY13(2)=-.08
CY13(3)=-.07
CY13(4)=.52
CY13(5)=-1.67
CY13(6)=4.04
CY13(7)=-8.13
CY13(8)=12.83
CY14(1)=.45
CY14(2)=-.04
CY14(3)=.05
CY14(4)=-.03
CY14(5)=-.12
CY14(6)=.47
CY14(7)=-1.38
CY14(8)=3.29
CY15(1)=.45
CY15(2)=-.04
CY15(3)=-.22
CY15(4)=1.05
CY15(5)=-3.15
CY15(6)=7.45
CY15(7)=-16.26
CY15(8)=36.09
CY16(1)=.32
CY16(2)=.01
CY16(3)=.02

CY1E(4)=-.22
CY16(5)=.95
CY16(6)=-3.6
CY16(7)=10.9
CY16(8)=-26.29
CY17(1)=.32
CY17(2)=.01
CY17(3)=-.24
CY17(4)=.82
CY17(5)=-2.35
CY17(6)=3.88
CY17(7)=.54
CY17(8)=-26.29
CY7(1)=.45
DY7(2)=-.25
DY7(3)=.25
DY7(4)=-.05
DY7(5)=-.35
DY7(6)=.65
DY7(7)=.05
DY8(1)=.5
DY8(2)=.25
DY8(3)=-.5
DY8(4)=.75
DY8(5)=-1.
DY8(6)=1.75
DY8(7)=-3.7
DY9(1)=1.25
DY9(2)=-1.
DY9(3)=2.
DY9(4)=-3.25
DY9(5)=4.75
DY9(6)=-3.
DY9(7)=-4.5
SL1=0.0
CONST1=0.0
SL2=1.75
SL3=1.75
SL4=1.75
DX1= 2.5
DX2= 4.
KK1=8
KK2=7
DOI=20.
GO TO 200
? OGH=20.
DY5(1)=.02
DY5(2)=.01
DY5(3)=-.02
DY5(4)=.04
DY5(5)=-.08
DY5(6)=.2
DY5(7)=-.51
DY5(8)=1.20
DY6(1)=.45

DY6(2)=.1
DY6(3)=-.2
DY6(4)=.3
DY6(5)=-.6
DY6(6)=1.55
DY6(7)=-3.9
DY6(8)=.1
DY7(1)=.16
DY7(2)=.08
DY7(3)=-.18
DY7(4)=.28
DY7(5)=-.360
DY7(6)=.4
DY8(1)=.16
DY8(2)=.24
DY8(3)=-.29
DY8(4)=1.34
DY8(5)=-4.59
DY8(6)=11.24
DY9(1)=.46
DY9(2)=.04
DY9(3)=.36
DY9(4)=-.76
DY9(5)=2.66
DY9(6)=-7.56
CONST1=.4
SL1=.04
SL2=1.44
SL3=1.44
SL4=1.44
DX1=2.5
DX2=3.5
KK1=8
KK2=6
DOI=50.
GO TO 13
200 IF(GW.GT.35.) GO TO 3

```
    KK1=8
    DO 100 I=1,KK1
    DY5(I)=DY11(I)
100  DY6(I)=CY11(I)
      GO TO 13
3 IF(GW.GT.40. ) GO TO 4
    KK1=8
    DO 101 I=1,KK1
    DY5(I)=DY12(I)
101  DYE(I)=CY12(I)
      GO TO 13
4 IF(GW.GT.45. ) GO TO 5
    KK1=8
    DO 102 I=1,KK1
    DY5(I)=DY13(I)
102  DY6(I)=CY13(I)
      GO TO 13
5 IF(GW.GT.50. ) GO TO 6
```

```

      KK1=8
      DO 103 I=1,KK1
      DY5(I)=DY14(I)
103  DY6(I)=CY14(I)
      GO TO 13
      6 IF(GW.GT.55.) GO TO 7
      KK1=8
      DO 104 I=1,KK1
      DY5(I)=DY15(I)
104  DY6(I)=CY15(I)
      GO TO 13
      7 IF(GW.GT.E0.) GO TO 8
      KK1=8
      DO 105 I=1,KK1
      DY5(I)=DY16(I)
105  DY6(I)=CY16(I)
      GO TO 13
      8 KK1=8
      DO 106 I=1,KK1
      DY5(I)=DY17(I)
106  DY6(I)=CY17(I)
13   CO=1.
      U=ALT/5000.
      IF(ACFT.E0.A7D) U=U-1
      DO 700 I=1,KK1
      CO=CO*U/FLOAT(I)
      U=U-1.
      SL1=DY5(I)*CO+SL1
700   CONST1=DY6(I)*CO +CONST1
      T=SL1*(GW-DGW) +CONST1
      CO =1.
      U=DI/DDI
      DO 701 I=1,KK2
      CO=CO*L/I
      U=U-1.
      701  SL2=DY7(I)*CO +SL2
      R=T*SL2
      IF(T.LE.DX1) GO TO 801
      CO =1.
      U=DI/DDI
      DO 702 I=1,KK2
      CO=U*CO/FLOAT(I)
      U=U-1.
      702  SL3=DY8(I)*CO+SL3
      R=SL2*DX1+SL3*(T-DX1)
      IF(T.LE.CX2) GO TO 801
      CO=1.
      U=DI/DDI
      DO 703 I=1,KK2
      CO=CO*U/FLOAT(I)
      U=U-1.
      703  SL4=DY9(I)*CO+SL4
      R=SL2*DX1+SL3*(DX2-DX1) +SL4*(T-DX2)
801   CONTINUE
      FUEL=R*100. +.5

```

300 GH=GW*1000.
 RETURN
 END

```

SUBROUTINE CRD(ACFT,ALT, W,DI,TNMPPF)
DIMENSION DY1(10),DY2(10), DY3(10),DY4(10)
COMMON/CACFT/F4E,A7D
INTEGER W
GW=W/1000.
TNMPPF=0.
IF(ACFT.EQ.F4E ) GO TO 1
IF(ACFT.EQ.A7D ) GO TO 2
1 DGW=30.
DY1(1)=-.01
DY1(2)=0.0
DY1(3)=0.0
DY1(4)=-.01
DY1(5)=.03
DY1(6)=-.06
DY1(7)=.08
DY1(8)=-.06
DY2(1)=.47
DY2(2)=.23
DY2(3)=-.2
DY2(4)=.09
DY2(5)=.2
DY2(6)=-.72
DY2(7)=1.27
DY2(8)=-1.2
DY3(1)=-.002
DY3(2)=.001
DY3(3)=-.001
DY3(4)=.0005
DY3(5)=.0013
DY3(6)=-.0053
DY3(7)=.0123
DY4(1)=-.002
DY4(2)=0.0
DY4(3)=.001
DY4(4)=-.002
DY4(5)=.002
DY4(6)=.001
DY4(7)=-.01
SL1=-.02
CONST1=2.
SL2=.016
CONST2=.028
KK1=8
KK2=7
DDI=20.
GO TO 13
2 DGW=15.
DY1(1)=0.0
DY1(2)=-.01
DY1(3)=.02
DY1(4)=-.04
DY1(5)=.06
DY1(6)=-.06
DY1(7)=-.01

```

```

DY1(8)=.22
DY1(9)=-.65
DY2(1)=.38
DY2(2)=.02
DY2(3)=-.02
DY2(4)=.12
DY2(5)=-.32
DY2(6)=.67
DY2(7)=-1.22
DY2(8)= 1.97
DY2(9)=-3.17
DY3(1)=-.01
DY3(2)=.0045
DY3(3)=-.0005
DY3(4)=-.0056
DY3(5)=.0167
DY3(6)=-.0357
DY4(1)=0.0
DY4(2)=-.01
DY4(3)=.02
DY4(4)=-.035
DY4(5)=.058
DY4(6)=-.093
CONST1=1.12
SL1=-.02
CONST2=.05
SL2=.05
DOI=50.
KK1=9
KK2=6
13 CO=1.
CO1= 1.
U=ALT/5000.
DO 700 I=1,KK1
CO=CO*U/FLOAT(I)
CO1=CO1*U/FLOAT(I)
SL1=DY1(I)*CO+SL1
CONST1=DY2(I)*CO1+CONST1
U=U-1.
700 CONTINUE
CO=1.
CO1=1.
U=DI/DOI
DO 701 I=1,KK2
CO=CO*U/FLOAT(I)
CO1=CO1*U/FLOAT(I)
SL2=DY3(I)*CO +SL2
CONST2=DY4(I)*CO1+CONST2
U=U-1.
701 CONTINUE
T=(SL1*(GH-DGW)+CONST1)
TNMPPF= SL2*(SL1*(GH-DGW) +CONST1) + CONST2
GH=GH*1000.
300 RETURN
END

```

APPENDIX II
PROGRAM INPUT LIST

31
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INPUT LIST

COLUMN	VARIABLE	FORMAT	
TYPE ONE CARD:			
1-10	ACFT	A	Aircraft: Left-hand justify
11-15	ALTG	F	Outbound altitude: feet
16-20	ALTR	F	Altitude returning: feet
21-25	ALTAT	F	Altitude in target area: feet
30	C	I	If C equals one, values of parameters are printed out after each segment of the mission for each iteration to permit checkout of the program.
TYPE TWO CARDS:			
1-4	FFSAT	I	Fuel for start and taxi: pounds
5-8	FFTO	I	Fuel for takeoff: pounds
9-12	FFDG	I	Fuel for outbound descent: pounds
17-20	FFDG	I	Fuel for descent returning: pounds
21-24	FFLAT	I	Fuel for landing and taxi: pounds
25-28	FTBR	I	Fuel to be returned: pounds
29-32	PR	I	Payload returned: pounds
33-35	DIG	F	Drag index outbound
36-38	DIR	F	Drag index returning
41-45	FAS	I	Fuel at engine start: pounds
46-50	P	I	Payload (any item capable of being dropped, ejected or jettisoned): pounds
51-56	BAW	I	Basic aircraft weight (gross weight at engine start less fuel and payload): pounds
57-60	DFSAT	F	Distance for start and taxi: NM

COLUMN	VARIABLE	FORMAT	
61-64	DFTO	F	Distance for takeoff: NM
65-68	DFDG	F	Distance for outbound descent: NM
69-72	DFL	F	Distance during loiter in target area: NM
73-76	DFDR	F	Distance for descent returning: NM
77-80	DFLAT	F	Distance for landing and taxi: NM

TYPE THREE CARD - An EOR (7/8/9) card follows the last Type Two card of a set of data
 Any number of sets of data may be used.

APPENDIX III
PROGRAM LIMITATIONS

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PROGRAM LIMITATIONS

F-4E and A-7D Aircraft

All climbs are at military thrust.

All cruises are at optimum Mach numbers.

Outbound and returning altitudes: 5,000 to 40,000 feet

Altitude in target area: 0 or 5,000 to 40,000 feet

F-4E restrictions:

Gross weight: 30,000 to 58,000 pounds

Drag indices: 0 to 140

A-7D restrictions:

Gross weight: 20,000 to 42,000 pounds

Drag indices: 0 to 300

APPENDIX IV
F-4E DRIVER FOR RADIUS OF ACTION
SUBROUTINES LISTING

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PROGRAM P37J5 TRACE

```
PROGRAM P37J5 (OUTPUT,TAPE6=OUTPUT)
DIMENSION IF(36,15),ID(36,15),JR(36,15)
COMMON/CACFT/F4E,A70
INTEGER W,FFCL
DATA F4E,A70,FFCL,I,DFCLT,FPCRT/3HF4E,3HA7D,4HFFCL,4HDFCL,4HFRCP/
DATA ACFT/3HF4E/
DO 40 J=1,36
DO 40 L=1,15
IF(J,L)=1HX
ID(J,L)=1HX
IR(J,L)=1HX
CONTINUE
ALT=50000.
DO 10 IA=1,15
W=300000
DO 20 IW=1,36
DI=0.
DO 30 IJI=1,15
CALL CLD(ACFT,ALT,W,DI,DFCL),
CALL CLF(ACFT,ALT,W,DI,FFCL)
CALL CRD(ACFT,ALT,W,DI,FRCR)
IF(IW,IJI)=FFCL
ID(IW,IDI)=DFCL*10.*5
IR(IW,IDI)=FRCR*10000.*5
DI=DI+10.
31 CONTINUE
W=W+1000
CONTINUE
CALL H(DFCLT,ACFT,ALT)
CALL D(ID)
CALL H(FFCLT,ACFT,ALT)
CALL D(IF)
CALL H(FRCRT,ACFT,ALT)
CALL D(IR)
ALT=ALT+2500.
41 CONTINUE
STOP
END
```

SUBROUTINE H TRACE

```
SUBROUTINE H(TABLE,ACFT,ALT)
COMMON/CACFT/F4,A70
DATA CD,CF,CR/HFFCL,4HFFCL,4HFR3R/
FORMAT(1H1,6IX,23,5H AIRCRAFT,/ ,58X,9HALITUOE-,F6.0,5H FEET)
FORMAT(1X,/ ,76X,1UHDRAG INDEX,/ ,1X,6HWEIGHT,23X,99HU 10 10 2
      10 30 50 60 70 80 90 100 110
      2 120 130 140)
904  FORMAT(56X,24HDISTANCE FOR CLIMB TABLE,/ ,43X,49HDISTANCES ARE IN N
      1AUTICAL MILES MULTIPLIED BY 10.)
905  FORMAT(55X,27HFUEL CONSUMPTION RATE TABLE,/ ,43X,50HRATES ARE IN N
      1AUTICAL MILES PER 10000 POUNDS FUEL.)
936  FORMAT(58X,2,HFUEL FOR CLIMB TABLE,/ ,58X,20HFUELS ARE IN POUNDS.)
      WRITE(6,901) ACFT,ALT
      IF(TABLE.EQ.CD) WRITE(5,904)
      IF(TABLE.EQ.CR) WRITE(6,905)
      IF(TABLE.EQ.CF) WRITE(6,906)
      WRITE(6,903)
      RETURN
END
```

15

SUBROUTINE D TRACE

```
SUBROUTINE D(N)
DIMENSION N(36,15)
FORMAT(17,17X,15I7)
FORMAT(1X)

      I=1
      IW=30000
      WRITE(6,902) IW,(N(I,L),L=1,15)
      WRITE(6,901) IW,(N(I,L),L=1,15)
      WRITE(6,902) IW,(N(I,L),L=1,15)
10      DO 10 J=1,5
           DO 9 K=1,5
               I=I+1
               IW=IW+1000
               WRITE(6,901) IW,(N(I,L),L=1,15)
9          CONTINUE
               WRITE(6,902) IW,(N(I,L),L=1,15)
10         CONTINUE
               WRITE(6,902) IW,(N(I,L),L=1,15)
               DO 15 K=1,3
                   I=I+1
                   IW=IW+1000
                   WRITE(6,901) IW,(N(I,L),L=1,15)
15         CONTINUE
                   DO 20 J=1,36
                       DO 20 L=1,15
                           N(J,L)=1HX
                           CONTINUE
20         RETURN
      END
```

APPENDIX V

**A-7D DRIVER FOR RADIUS OF ACTION
SUBROUTINES LISTING**

PROGRAM P3700 TRACE

```

PROGRAM P3700 (OUTPUT,TAPE=6=OUTPUT)
DIMENSION IF(35,16),ID(35,16),IR(35,16)
COMMON/CACFT/F4E,A7D
INTEGER H,FFCL
DATA F4E,A7D,FFCLT,DFCLT,FRCRT/3HF4E,3HA70,4HFFCL,4HFRCR/
      DATA ACFT/3HA70/
DO 40 J=1,36
DO 40 L=1,15
IF(J,L)=1HX
IN(J,L)=1HX
IP(J,L)=1HX
CONTINUE
ALT=5000.
DO 10 IA=1,15
W=20000
DO 20 IW=1,23
DI=0.
DO 30 IJI=1,16
CALL CLD(ACFT,ALT,W,DI,DFCL),
      CALL CLF(ACFT,ALT,W,DI,FFCL)
CALL CRD(ACFT,ALT,W,DI,FRCR)
IF(IW,IDI)=FFCL
ID(IW,IDI)=DFCL*10.*.5
IR(IW,IDI)=FRCR*10000.*.5
DI=DI+10.
CONTINUE
W=W+1000
CONTINUE
20 CALL H(DFCLT,ACFT,ALT)
CALL D(ID)
CALL H(FFCLT,ACFT,ALT)
CALL D(IF)
CALL H(FRCRT,ACFT,ALT)
CALL D(IR)
ALT=ALT+25J0.
CONTINUE
STOP
END

```

SUBROUTINE H TRACE

```
SUBROUTINE H(CTABLE,ACFT,ALT)
COMMON/JACFT/F4E,57D
DATA CD,CF,CR/4HDFCL,4HFRCR/
FORMAT(1H1,61X,A3,9H AIRCRAFT,/ ,58X,9HALITUOE-,F6.0,5H FEET)
FORMAT(1X,/ ,76X,1UHDRA INDEX,/ ,1X,6HWEIGHT,23X,106H0 26 4
      10   60   80   100  120  140  160  180  200  220
      2   240   260   280   300)
904  FORMAT(56X,24HDISTANCE FOR CLIMB TABLE,/ ,43X,49HDISTANCES ARE IN N
      1AUTICAL MILES MULTIPLIED BY 10.)
FORMAT(55X,27HFUEL CONSUMPTION RATE TABLE,/ ,43X, SUHRATES ARE IN N
      1AUTICAL MILES PER 10000 POUNDS FUEL.)
FORMAT(58X,20HFUEL FOR CLIMB TABLE,/ ,58X,20HFUELS ARE IN POUNDS.)
      WRITE(6,901) ACFT,ALT
      IF(TABLE.EQ.CD) WRITE(6,904)
      IF(TABLE.EQ.CR) WRITE(6,905)
      IF(TABLE.EQ.CF) WRITE(6,906)
      WRITE(6,903)
      RETURN
END
```

15

```

SUBROUTINE D      TRACE
SUBROUTINE D(N)
DIMENSION N(35,16)
FORMAT(I7,I7X,16I7)
FORMAT(1X)

      5          I=1
      IW=20000
      WRITE(6,902)
      WRITE(6,901) IW,(N(I,L),L=1,16)
      WRITE(6,902)
      DO 10 J=1,4
      DO 9 K=1,5
      I=I+1
      IW=IW+1000
      WRITE(6,901) IW,(N(I,L),L=1,16)
      CONTINUE
      9          WRITE(6,902)
      CONTINUE
      WRITE(6,902)
      DO 15 K=1,2
      I=I+1
      IW=IW+1000
      WRITE(6,901) IW,(N(I,L),L=1,16)
      15        CONTINUE
      DO 20 J=1,35
      DO 20 L=1,16
      N(J,L)=1HX
      CONTINUE
      20        RETURN
      END

```

APPENDIX VI
TABULAR DATA FOR THE F-4E AIRCRAFT

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F4E AIRCRAFT
ALTITUDE - 5000 FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX										100	110	120	130	140
	40	50	60	70	80	90	100	110	120	130					
30000	10	20	30	40	50	60	70	80	90	100	22	24	26	28	26
31000	16	21	16	14	16	18	20	24	21	21	23	24	25	24	29
32000	17	20	17	15	17	19	21	24	21	22	23	25	25	25	30
33000	17	21	17	15	17	20	22	22	21	22	24	26	26	26	31
34000	18	22	18	16	18	21	23	23	23	23	25	27	27	26	32
35000	18	22	18	16	18	21	23	24	23	24	26	28	28	27	33
36000	19	23	19	17	19	22	24	24	24	24	26	28	29	28	33
37000	19	24	19	17	19	22	25	25	25	25	27	29	29	28	34
38000	20	24	18	16	20	23	25	25	25	25	26	28	30	29	35
39000	21	26	21	19	21	24	26	26	26	26	26	28	31	30	36
40000	21	26	21	19	21	24	26	27	26	27	27	29	31	32	37
41000	22	27	22	20	22	25	27	27	27	27	28	30	32	33	36
42000	22	27	22	20	22	26	28	28	28	28	30	31	33	32	39
43000	23	28	23	21	23	26	28	29	29	29	30	31	34	33	41
44000	23	29	23	21	23	27	29	29	29	29	30	32	34	35	41
45000	24	29	24	22	24	27	30	30	30	30	33	35	35	34	42
46000	27	33	27	24	27	31	33	34	33	34	37	40	40	39	47
47000	28	34	23	25	24	32	34	35	34	35	36	39	42	41	48
48000	28	35	26	26	26	33	35	36	35	36	37	40	42	43	51
49000	29	36	29	26	29	34	36	37	36	37	40	43	44	42	51
50000	30	37	31	27	30	35	37	36	37	36	41	44	45	43	52
51000	25	31	25	23	25	29	31	32	31	32	35	37	38	36	44
52000	26	32	26	24	26	33	32	33	32	33	36	39	39	38	45
53000	27	33	27	24	27	31	33	34	33	34	37	40	40	39	46
54000	28	34	28	26	28	32	34	35	34	35	38	41	41	40	46
55000	28	35	28	26	28	33	35	36	35	36	39	42	43	41	50
56000	28	35	28	26	28	33	35	36	35	36	39	42	43	41	50
57000	30	37	30	27	30	34	37	38	37	38	39	42	43	43	52
58000	31	38	31	28	31	34	39	39	39	39	40	46	47	45	55

F4E AIRCRAFT
ALTITUDE - 5000. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	93	116	117	123	127	131	136	147	159	171	180	185	188	193	207
31000	95	109	119	126	130	135	141	151	163	175	185	190	193	212	217
32000	97	111	122	129	133	138	145	154	167	179	189	195	197	202	222
33000	100	114	125	132	137	141	143	153	158	171	183	193	199	206	227
34000	102	117	128	135	140	144	151	162	175	188	198	203	204	211	232
35000	104	119	131	136	143	146	155	165	176	192	202	203	211		
36000	106	122	134	141	146	151	158	169	182	196	207	213	216	237	
37000	109	124	137	144	149	154	161	173	186	200	211	217	220	242	
38000	111	127	139	147	152	157	165	176	190	204	216	221	225	247	
39000	112	129	142	150	155	160	168	180	194	209	220	226	230	252	
40000	115	132	145	153	158	164	172	183	196	213	224	230	234	257	
41000	118	135	148	156	162	167	175	187	202	217	229	235	236	239	262
42000	120	137	151	156	165	170	178	191	206	221	233	239	240	243	266
43000	122	140	154	162	168	173	180	192	210	225	238	244	245	246	273
44000	125	143	157	165	171	177	185	198	214	230	242	248	249	253	278
45000	127	145	159	168	174	180	186	201	217	234	246	253	254	257	283
46000	130	154	169	179	185	191	200	214	231	248	262	269	273	300	
47000	132	156	174	183	190	196	205	219	237	255	269	276	280	306	
48000	142	162	176	188	198	201	211	225	243	261	275	283	287	316	
49000	145	166	183	193	199	206	216	231	249	268	282	289	294	324	
50000	149	170	187	197	204	211	221	236	255	274	289	296	297	302	331
51000	152	174	191	202	209	216	226	242	261	281	296	303	304	339	
52000	156	178	196	207	214	221	231	247	267	287	303	310	311	347	
53000	159	182	206	211	218	226	237	253	273	293	309	317	319	355	
54000	163	186	205	216	223	231	242	258	279	300	316	324	330	363	
55000	166	190	209	221	228	236	247	264	285	305	323	331	337	370	
56000	156	179	195	207	214	221	232	243	268	286	303	311	312	348	
57000	160	183	201	212	219	227	236	254	274	295	311	319	320	356	
58000	164	187	206	217	225	232	243	264	281	302	318	326	328	365	

F4E AIRCRAFT
ALTITUDE- 5000 FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	675	644	606	579	561	545	526	503	479	458	442	428	412	391	378
31000	670	639	602	575	557	542	523	500	476	455	439	420	411	389	375
32000	666	635	597	571	553	538	513	497	473	452	436	423	407	387	373
33000	661	630	593	567	549	534	516	493	470	449	433	420	404	384	370
34000	656	626	589	563	545	530	512	490	467	446	430	417	401	382	368
35000	651	621	585	559	542	526	508	487	464	442	427	414	399	379	366
36000	646	617	581	555	536	523	505	483	460	440	424	411	396	377	363
37000	642	612	576	551	534	519	501	480	457	437	421	408	393	374	361
38000	637	608	572	547	530	515	498	476	454	434	419	405	391	372	358
39000	632	603	568	543	526	511	494	473	451	431	416	403	388	370	356
40000	627	599	564	539	522	508	490	470	448	428	413	400	385	367	354
41000	622	594	560	535	518	504	487	466	445	425	410	397	383	365	351
42000	618	589	555	531	514	500	483	463	442	422	407	394	381	362	349
43000	613	585	551	527	510	496	480	460	438	419	404	391	377	360	346
44000	608	580	547	523	506	492	476	456	435	416	401	388	374	357	344
45000	603	576	543	519	503	489	472	453	432	413	398	385	372	355	342
46000	598	571	539	515	499	485	469	449	429	410	395	382	369	353	339
47000	594	567	534	511	495	481	465	446	426	407	392	380	366	350	337
48000	589	562	530	507	491	477	462	443	423	404	389	377	364	350	334
49000	584	558	526	503	487	474	458	439	419	401	386	374	361	345	332
50000	579	553	522	499	483	470	454	436	416	398	383	371	358	343	330
51000	574	549	516	495	479	466	451	433	413	395	380	368	355	340	327
52000	570	544	513	491	475	462	447	429	410	392	377	365	353	338	325
53000	565	540	509	487	471	458	444	426	407	389	374	362	350	336	322
54000	560	535	505	483	467	455	440	423	404	386	371	359	347	333	320
55000	555	530	501	479	464	451	436	419	401	383	369	357	345	331	318
56000	550	526	497	475	460	447	433	416	397	380	366	354	342	326	315
57000	546	521	492	471	456	443	429	412	394	377	363	351	339	326	313
58000	541	517	488	467	452	439	426	409	391	374	360	348	337	324	310

F4E AIRCRAFT
ALTITUDE- 7500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	DRAG INDEX		
																34	35	
30000	26	32	26	24	25	30	33	33	33	34	34	34	34	34	34	37	37	37
31000	27	33	27	24	27	31	34	34	34	34	34	34	34	34	34	40	40	40
32000	27	34	27	25	27	32	34	34	35	34	35	35	35	35	36	41	41	40
33000	28	35	28	25	26	32	35	35	36	35	36	36	36	36	36	42	42	41
34000	29	35	29	26	29	33	36	36	36	36	37	37	37	37	38	43	43	42
35000	29	36	29	27	29	34	37	37	37	37	37	37	37	38	40	44	44	42
36000	30	37	30	27	30	35	36	36	36	36	36	36	36	36	36	45	45	43
37000	31	38	31	28	31	31	35	35	36	35	36	35	35	35	35	46	46	44
38000	31	39	31	29	31	31	36	36	36	36	36	36	36	36	36	47	47	45
39000	32	41	32	29	32	32	37	37	37	37	37	37	37	37	37	48	48	46
40000	33	40	33	30	33	33	36	36	36	36	36	36	36	36	36	49	49	46
41000	33	41	33	31	34	33	39	39	39	39	39	39	39	39	39	50	50	48
42000	34	42	34	31	34	34	40	40	40	40	40	40	40	40	40	51	51	49
43000	35	42	35	31	35	35	40	41	41	41	41	41	41	41	41	52	52	50
44000	35	44	35	32	35	35	41	41	41	41	41	41	41	41	41	53	53	51
45000	36	44	36	33	36	33	36	36	36	36	36	36	36	36	36	54	54	52
46000	46	57	45	42	46	53	53	53	53	53	53	53	53	53	53	59	59	57
47000	47	59	47	43	47	55	55	55	55	55	55	55	55	55	55	60	60	58
48000	49	60	49	44	49	56	61	61	61	61	61	61	61	61	61	67	67	65
49000	50	62	50	45	50	58	63	63	63	63	63	63	63	63	63	74	74	66
50000	52	64	52	47	52	60	64	64	64	64	64	64	64	64	64	76	76	70
51000	50	62	50	46	50	58	63	63	63	63	63	63	63	63	63	75	75	68
52000	52	64	52	47	52	60	65	65	65	65	65	65	65	65	65	76	76	70
53000	53	65	53	46	53	61	66	66	66	66	66	66	66	66	66	77	77	72
54000	54	67	54	49	54	62	67	67	67	67	67	67	67	67	67	80	80	78
55000	55	68	55	50	55	55	64	64	64	64	64	64	64	64	64	82	82	81
56																76	76	70
56000	51	63	51	46	51	59	64	65	65	65	65	65	65	65	65	71	71	66
57000	53	65	53	48	53	61	66	66	66	66	66	66	66	66	66	72	72	69
58000	54	66	54	49	54	62	67	67	67	67	67	67	67	67	67	74	74	61

F4E AIRCRAFT
ALTITUDE- 7500 FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	0	100	200	300	400	500	600	700	DRAG INDEX	90	100	110	120	130	140
30000	141	162	176	183	194	200	210	224	242	261	275	282	283	287	315
31000	146	167	183	194	200	207	217	232	250	269	283	291	292	296	325
32000	150	172	189	199	206	213	223	239	258	277	292	299	300	305	335
33000	155	177	194	205	212	219	230	246	265	285	300	306	309	314	345
34000	159	182	210	211	213	225	236	253	273	293	309	317	318	322	355
35000	164	187	206	217	224	232	243	261	280	301	316	326	327	331	364
36000	168	192	211	223	230	238	250	267	286	310	326	335	336	340	374
37000	172	197	217	229	236	244	256	274	296	316	335	342	350	364	394
38000	177	202	222	235	243	251	263	281	303	326	344	353	359	364	394
39000	181	207	226	241	249	257	269	288	311	334	352	361	363	368	404
40000	186	212	234	247	255	263	276	295	316	342	361	370	372	377	414
41000	197	214	235	248	256	265	276	297	320	344	363	373	374	379	417
42000	190	217	238	252	260	269	282	301	322	349	368	376	379	384	422
43000	192	220	242	255	264	272	286	305	329	354	373	383	384	390	428
44000	195	223	245	259	267	276	289	309	334	359	377	386	390	395	434
45000	197	226	248	262	271	280	293	313	336	364	394	395	400	400	440
46000	210	240	264	279	286	297	312	333	360	387	406	416	424	426	466
47000	216	247	271	286	296	316	320	342	370	397	419	430	431	437	481
48000	221	253	276	294	304	314	329	352	380	406	430	442	443	449	493
49000	227	260	286	301	311	322	337	361	389	419	441	453	454	460	506
50000	233	266	293	309	317	330	346	370	399	429	452	464	466	472	519
51000	236	270	297	313	324	334	351	375	405	435	456	470	472	474	526
52000	239	274	301	317	326	339	355	380	410	441	465	477	478	485	533
53000	242	277	305	322	332	343	360	385	415	447	471	483	485	491	540
54000	246	281	309	326	337	346	365	391	421	452	477	489	491	496	547
55000	249	284	313	330	341	352	369	395	426	454	483	496	497	524	554
56000	251	278	293	303	313	329	351	379	407	430	451	462	468	473	513
57000	258	285	302	312	322	336	361	390	419	442	461	465	467	471	521
58000	254	294	310	321	331	346	371	391	421	454	468	474	477	481	521

F4E AIRCRAFT
ALTITUDE - 7500 FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 1000 POUNDS FUEL.

WEIGHT	LPG INDEX							110	120	130	140
	0	10	20	30	40	50	60				
30000	726	692	651	621	603	586	565	539	513	490	473
31000	726	687	645	617	598	581	560	535	509	487	470
32000	715	691	540	612	593	576	556	531	505	483	466
33000	709	676	635	607	589	572	552	527	501	479	452
34000	703	670	630	602	584	567	547	523	498	476	449
35000	697	665	625	597	573	563	543	519	494	472	445
36000	691	659	620	592	574	556	536	515	490	468	445
37000	685	654	615	587	563	553	534	511	480	465	446
38000	680	648	610	582	565	549	530	506	482	461	445
39000	674	643	604	578	560	544	525	502	478	457	431
40000	668	637	599	573	555	540	521	493	475	454	436
41000	662	632	594	568	550	535	517	494	471	450	434
42000	656	626	589	563	545	530	512	493	471	450	433
43000	650	620	584	558	541	526	508	486	463	442	427
44000	644	615	579	553	539	521	503	482	460	439	423
45000	639	609	574	548	531	517	499	478	455	435	419
46000	633	604	569	543	527	512	495	474	452	432	417
47000	627	598	504	539	522	507	490	470	448	428	413
48000	621	592	558	534	517	503	486	465	444	424	409
49000	615	587	553	529	512	495	481	461	440	421	405
50000	609	562	548	524	503	494	477	457	435	417	399
51000	604	576	543	519	503	489	473	453	432	413	398
52000	598	571	534	514	494	480	468	449	429	410	395
53000	592	565	533	509	493	480	464	445	425	406	391
54000	566	526	504	483	475	460	441	421	402	387	375
55000	554	523	500	484	471	455	437	417	399	384	372
56000	549	518	495	479	466	451	433	413	398	386	372
57000	543	512	490	474	461	446	429	409	394	387	373
58000	536	507	485	474	457	442	424	405	398	381	361

F4E AIRCRAFT
ALTITUDE-10000 FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	34	*2	34	31	34	39	*2	43	42	43	47	50	51	49	59
31000	35	*3	35	32	37	40	44	44	45	45	48	52	53	51	61
32000	36	*45	36	33	36	42	45	45	46	50	50	54	52	63	63
33000	37	*46	37	34	37	43	47	47	48	51	55	56	54	65	65
34000	38	*47	39	35	38	44	48	48	49	53	57	55	57	67	67
35000	39	*49	39	36	39	42	49	49	50	54	54	59	57	69	69
36000	40		40	37	40	47	51	51	52	56	60	61	58	71	
37000	42	51	42	36	42	48	52	53	52	57	62	62	64	73	
38000	43	53	43	39	43	49	53	54	53	55	59	63	64	75	
39000	44	54	44	40	44	50	55	55	55	56	60	65	66	77	
40000	45	55	45	41	45	52	56	57	56	57	62	66	67	76	
41000	46	57	46	42	46	53	57	58	57	59	63	66	69	71	
42000	47	58	47	42	47	54	59	59	59	60	65	70	70	73	
43000	48	59	48	43	48	55	60	61	61	61	66	71	72	75	
44000	49	61	49	44	49	57	61	62	61	63	68	73	74	76	
45000	50	62	50	45	50	58	63	63	63	64	69	74	75	78	
46000	63	78	63	57	63	73	79	80	79	81	87	94	95	91	111
48000	65	81	65	59	65	75	82	83	82	84	90	97	98	94	114
49000	67	83	67	61	67	78	84	85	85	86	93	100	103	100	118
50000	72	88	72	65	72	83	89	91	91	92	98	106	107	103	125
51000	74	91	74	67	74	85	92	93	92	94	101	109	111	106	129
52000	76	93	76	59	76	87	95	96	95	97	104	112	114	109	133
53000	78	96	78	70	78	90	97	98	97	100	107	115	117	112	136
54000	80	99	80	72	80	92	100	101	100	102	110	118	120	115	140
55000	82	100	82	75	83	95	103	105	104	107	114	123	125	122	146
56000	76	94	76	69	75	88	96	97	96	98	105	113	115	111	134
57000	79	97	79	71	79	91	99	100	99	101	109	117	118	114	136
58000	81	100	82	75	82	94	104	105	104	105	113	122	124	120	144

F4E AIRCRAFT
ALTITUDE - 10000 FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
33000	171	.96	216	228	235	243	255	272	294	315	333	342	343	346	382
34000	176	202	222	234	242	250	262	280	302	325	343	352	353	358	393
35000	181	207	228	241	249	257	269	288	311	335	352	361	363	368	394
36000	186	213	234	247	255	264	277	296	319	343	362	371	372	377	415
37000	191	219	240	254	262	271	284	303	328	352	371	381	382	387	426
38000	196	224	245	260	269	278	291	311	335	361	381	391	392	397	437
39000	201	236	253	267	276	285	298	319	344	374	396	400	402	407	448
40000	206	235	259	273	282	292	306	327	353	379	400	413	417	459	
41000	211	241	265	280	289	298	313	332	361	383	409	420	421	427	
42000	216	247	271	286	296	305	320	342	370	397	419	430	431	437	480
43000	220	252	277	293	302	312	328	350	378	406	428	439	441	447	491
44000	225	258	283	299	309	319	335	356	386	415	436	449	451	457	502
45000	230	263	286	306	315	326	342	365	395	424	451	469	471	477	513
46000	235	269	296	312	323	333	349	373	403	433	460	477	479	480	
47000	240	275	302	319	329	340	357	381	412	442	466	479	480	487	
48000	245	280	308	325	336	347	364	389	420	451	476	486	490	497	546
49000	250	294	323	341	352	364	382	408	440	473	499	512	514	521	573
50000	255	291	331	351	364	373	392	413	452	486	512	525	527	534	
51000	260	299	330	350	359	371	383	401	429	463	498	525	540	548	602
52000	264	309	340	359	367	380	392	411	440	475	514	538	552	561	617
53000	270	317	348	367	380	392	404	424	450	486	522	551	565	575	632
54000	277	317	348	367	380	392	404	424	450	486	522	551	565	575	
55000	283	324	356	376	389	402	414	434	460	487	523	551	565	575	
56000	296	332	365	385	404	411	431	451	477	501	535	564	578	588	647
57000	339	373	394	407	420	441	471	509	547	577	592	624	661		
58000	343	377	397	413	430	451	482	520	559	590	605	637	676		
59000	343	377	381	413	430	451	482	514	571	602	634	661	691		
60	343	375	355	390	425	439	461	532	563	615	631	633	642	706	
61	343	375	362	398	424	449	474	543	584	615					
62	364	409	423	457	481	513	546	587	619	655	687	696	696	696	710
63	373	414	423	448	462	474	513	559	597	634	662	672			
64	373	414	420	444	453	474	513	573	616	654	688	696	696	696	745

F4E AIRCRAFT
ALTITUDE-16300. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	767	750	744	732	652	634	610	582	553	528	511	495	475	448	434
31000	781	744	698	667	647	629	606	577	549	524	507	492	472	445	430
32000	774	738	693	662	642	624	601	573	544	520	503	488	465	441	427
33000	768	732	687	656	636	619	596	568	540	516	499	484	464	438	424
34000	762	726	681	651	631	614	591	564	536	512	495	481	461	435	421
35000	755	724	676	645	625	608	586	559	532	508	491	476	457	432	418
36000	749	714	670	640	621	603	582	555	528	504	487	472	454	429	414
37000	742	708	665	635	616	598	577	550	523	500	483	469	450	425	411
38000	736	701	659	629	614	593	572	549	520	496	479	465	446	422	408
39000	729	695	653	624	605	588	567	542	515	492	475	461	443	419	405
40000	723	589	648	619	600	583	562	537	511	488	471	457	439	416	402
41000	717	583	642	613	595	576	558	533	507	484	468	453	430	412	398
42000	710	577	637	608	590	573	553	528	502	480	464	449	432	409	395
43000	704	571	631	603	584	568	550	524	498	476	460	446	428	406	392
44000	698	565	597	597	579	563	543	519	497	472	450	442	425	403	389
45000	691	559	562	574	592	579	563	545	515	490	468	452	438	421	399
46000	685	553	564	587	669	553	534	510	486	464	446	434	418	396	382
47000	678	547	569	581	564	548	529	506	481	460	444	430	414	393	379
48000	672	541	563	576	558	543	524	501	477	456	446	432	414	391	376
49000	666	535	577	571	563	538	519	497	473	452	436	423	407	387	373
50000	659	529	592	565	544	533	514	492	469	448	432	419	403	383	370
51000	653	523	586	560	543	526	510	488	465	444	428	415	392	366	352
52000	646	517	581	555	533	523	505	483	460	440	424	411	396	377	363
53000	640	511	575	549	532	518	500	479	456	436	420	407	392	374	360
54000	634	505	569	544	527	513	495	474	452	432	417	404	389	370	357
55000	627	500	564	539	522	508	490	470	448	428	413	400	387	367	354
56000	621	593	558	533	517	503	486	465	444	424	409	396	382	364	350
57000	614	587	553	528	512	497	481	461	439	420	405	392	378	361	347
58000	608	580	547	523	505	492	476	456	435	416	402	388	374	357	344

F4E AIRCRAFT
ALTITUDE-2500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX										11. 12. 13. 14.	
	0	10	20	30	40	50	60	70	80	90		
30000	4.3	5.4	4.3	3.9	4.3	5.0	4.4	5.5	5.4	5.6	6.0	6.4
31000	4.5	5.6	4.5	4.1	4.5	5.2	5.6	5.7	5.0	5.8	6.2	6.7
32000	4.7	5.8	4.7	4.2	4.7	5.4	5.8	5.9	5.8	6.3	6.4	6.9
33000	4.8	5.9	4.8	4.4	4.8	5.6	6.0	6.1	6.0	6.2	6.6	7.1
34000	5.0	6.1	5.0	4.5	5.0	5.7	6.2	6.3	6.2	6.9	7.4	7.9
35000	5.1	6.3	5.1	4.6	5.1	5.9	6.4	6.5	6.4	7.1	7.5	8.0
36000	5.3	6.5	5.3	4.8	5.3	6.1	6.6	6.7	6.6	7.3	7.8	8.3
37000	5.5	6.7	5.5	4.9	5.5	6.3	6.8	6.9	6.8	7.5	8.1	8.6
38000	5.6	6.9	5.6	5.1	5.6	6.5	7.0	7.1	7.0	7.7	8.3	8.8
39000	5.8	7.1	5.8	5.2	5.8	6.7	7.2	7.3	7.2	7.9	8.5	9.1
40000	5.9	7.3	5.9	5.4	5.9	6.8	7.4	7.5	7.4	8.2	8.8	9.5
41000	6.1	7.5	6.1	5.5	6.1	7.0	7.6	7.7	7.6	8.3	9.1	9.8
42000	6.2	7.7	6.2	5.6	6.2	7.2	7.8	7.9	7.8	8.6	9.4	10.1
43000	6.4	7.9	6.4	5.8	6.4	7.4	8.0	8.1	8.0	8.8	9.6	10.2
44000	6.6	8.1	6.6	5.9	6.6	7.6	8.2	8.3	8.2	9.0	9.8	10.5
45000	6.7	8.3	6.7	6.1	6.7	7.8	8.4	8.5	8.4	9.2	10.0	10.8
46000	7.0	9.6	7.0	7.8	9.0	9.7	9.6	9.7	9.6	10.7	11.5	12.2
47000	8.0	9.9	8.0	7.3	9.1	9.3	10.2	10.4	10.2	11.3	12.1	12.8
48000	8.3	10.1	8.4	7.7	8.4	9.6	10.4	10.6	10.5	11.7	12.5	13.2
49000	8.5	10.3	8.7	8.1	8.3	10.0	10.8	11.1	11.1	12.2	13.3	14.2
50000	8.8	10.5	9.0	8.5	9.2	10.4	11.2	11.5	11.6	12.8	13.8	14.2
51000	9.1	10.7	9.4	8.9	9.7	10.8	11.7	12.1	12.2	13.7	15.1	15.3
52000	9.4	10.9	9.7	9.0	9.8	11.2	12.1	12.5	12.6	13.2	14.1	16.1
53000	9.7	11.1	10.1	9.8	10.5	11.6	12.5	13.0	13.3	13.8	14.7	17.0
54000	9.9	11.3	10.4	10.2	10.9	12.0	12.9	13.4	13.8	14.4	15.3	17.3
55000	10.2	11.5	10.7	10.6	11.3	12.4	13.3	13.9	14.4	15.0	16.8	18.0
56000	9.5	11.0	9.9	9.6	10.3	11.4	12.3	12.8	13.1	13.6	14.4	15.5
57000	9.9	11.2	10.3	10.1	10.3	11.9	12.8	13.3	13.7	14.3	15.2	16.6
58000	10.2	11.5	10.7	10.6	11.3	12.3	13.3	13.9	14.4	15.0	15.9	17.7

F4E AIRCRAFT
ALTITUDE-125-J. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	0	100	200	300	400	500	600	700	800	DRAG INDEX	90	100	110	120	130	140
30000	203	232	255	269	279	285	295	301	322	347	373	394	404	405	411	452
31000	208	236	262	276	285	295	309	334	357	363	464	*15	422	464		
32000	214	244	268	283	293	303	317	339	366	394	*15	426	*27	433	476	
33000	219	251	275	291	300	310	325	348	375	404	*26	437	*38	444	488	
34000	224	257	282	298	309	318	334	356	385	414	436	447	*43	455	500	
35000	230	263	289	305	315	326	342	365	394	424	447	458	*64	466	512	
36000	235	269	296	312	323	333	350	374	404	434	457	469	*71	477	525	
37000	241	273	303	320	330	341	358	382	413	444	468	*80	482	486	537	
38000	246	282	310	327	333	349	366	391	422	454	479	491	*93	499	549	
39000	252	283	316	334	345	357	374	400	432	464	489	502	504	510	561	
40000	257	294	323	341	353	364	382	408	441	474	500	513	514	521	573	
41000	266	304	335	353	365	377	395	423	456	490	517	530	532	539	593	
42000	274	313	344	363	375	386	416	434	469	504	531	545	547	554	610	
43000	281	321	353	373	385	398	417	446	482	518	546	560	562	569	626	
44000	288	328	362	383	395	408	428	458	494	531	560	575	577	584	643	
45000	296	334	372	393	406	419	439	469	507	545	575	589	591	599	659	
46000	306	354	387	416	423	449	465	485	524	563	594	609	611	620	681	
47000	313	358	394	416	430	444	465	497	537	577	609	624	627	635	698	
48000	321	367	403	426	440	455	477	509	550	591	623	640	642	650	715	
49000	328	376	413	436	450	465	486	521	563	605	638	655	657	666	732	
50000	336	384	422	446	461	476	499	533	576	619	653	670	672	681	749	
51000	342	391	430	454	469	484	508	543	586	630	664	681	684	693	762	
52000	352	402	442	467	482	498	522	558	603	648	683	701	703	713	784	
53000	361	415	454	480	496	512	537	574	624	666	702	723	729	733	806	
54000	371	425	467	493	509	526	552	589	636	684	721	740	743	753	827	
55000	381	436	479	506	523	540	566	605	653	702	740	759	762	772	849	
56000	403	461	506	535	552	571	598	644	691	742	783	803	806	817	898	
57000	412	471	518	547	565	584	612	624	706	759	801	821	824	835	918	
58000	421	482	530	559	573	597	627	669	722	776	819	840	843	854	939	

FILE AIRCRAFT
ALTITUDE-12500. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 1000 POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	846	808	757	723	702	682	656	625	593	567	548	532	514	479	464
31000	841	801	751	717	690	676	651	620	588	562	544	528	506	475	461
32000	834	794	745	711	690	671	646	615	584	558	539	524	502	472	457
33000	827	786	739	705	685	665	640	610	579	554	535	519	493	468	454
34000	820	781	733	700	679	661	635	605	574	549	534	515	494	465	450
35000	813	775	727	694	673	654	630	600	570	545	527	511	490	461	447
36000	806	768	720	688	666	649	625	595	565	540	522	507	480	457	443
37000	799	761	714	682	652	643	619	590	561	536	516	503	482	454	444
38000	792	755	708	676	650	638	614	585	556	532	514	493	473	450	436
39000	785	748	702	671	651	632	609	581	552	527	509	494	474	451	433
40000	778	741	696	665	645	627	604	576	547	523	505	490	470	443	429
41000	771	735	690	659	633	611	598	571	542	516	501	486	466	440	426
42000	764	728	684	653	633	616	593	566	538	514	497	482	462	436	422
43000	757	722	678	647	623	604	588	561	533	510	492	478	458	433	419
44000	750	715	671	641	622	605	583	555	529	505	488	473	455	432	415
45000	743	708	665	636	610	599	577	551	524	501	484	469	451	426	412
46000	736	702	659	630	601	594	572	546	519	497	479	465	447	422	406
47000	729	695	653	624	603	588	567	541	515	492	475	461	443	419	405
48000	722	689	647	618	599	563	546	520	496	471	457	439	415	398	384
49000	715	642	614	612	594	577	556	532	503	483	467	452	435	412	390
50000	708	675	635	606	588	572	551	527	501	479	462	448	431	408	394
51000	701	659	629	601	582	566	546	522	497	475	458	444	427	405	391
52000	694	652	623	595	577	561	544	517	492	471	454	437	423	401	387
53000	687	635	616	589	571	555	536	512	487	466	450	430	419	398	384
54000	680	649	610	583	565	549	520	507	483	462	445	432	415	395	380
55000	673	642	594	577	560	544	525	502	478	457	441	427	411	390	377
56000	666	636	598	571	554	538	520	497	474	453	437	423	407	387	373
57000	659	629	592	560	543	533	515	492	469	446	432	419	403	383	370
58000	652	592	566	544	527	513	497	474	451	436	426	415	399	383	366

F4E AIRCRAFT
ALTITUDE-15000 FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	
	56	69	56	51	56	65	70	71	70	72	74	75	77	77	76	76
31000	58	72	58	52	58	67	72	73	72	75	77	77	79	79	80	80
32000	60	74	60	54	60	69	75	76	75	77	78	78	79	79	80	80
33000	62	76	62	56	62	72	77	77	76	78	80	80	82	82	83	83
34000	64	79	64	58	64	74	74	74	74	75	76	76	78	78	79	79
35000	66	81	66	60	66	76	82	83	82	84	82	84	91	91	92	92
36000	68	84	68	62	68	78	85	86	85	87	93	93	101	102	98	119
37000	70	86	70	63	70	81	87	89	87	90	92	92	105	105	101	122
38000	72	89	72	65	72	83	90	91	90	92	95	95	107	108	108	126
39000	74	91	74	67	74	85	92	94	92	95	97	97	102	104	111	129
40000	76	94	76	69	76	86	95	96	95	97	104	104	113	113	114	133
41000	78	96	78	71	78	90	97	99	97	100	107	107	116	117	113	136
42000	80	99	80	72	80	92	100	101	100	103	102	110	119	120	116	146
43000	82	101	82	75	83	95	103	105	103	107	114	114	123	125	122	146
44000	84	102	84	78	85	98	106	108	106	111	111	119	128	128	129	152
45000	86	103	87	82	89	101	109	112	112	115	123	123	133	136	135	158
46000	92	107	95	90	98	109	116	122	122	124	151	156	136	152	154	175
47000	95	110	98	95	102	113	122	126	129	134	143	153	160	164	164	184
48000	97	111	102	99	106	117	126	131	135	140	146	149	159	173	192	225
49000	100	113	105	103	110	121	130	136	140	146	155	166	175	182	200	233
50000	103	115	108	107	114	125	134	141	140	152	161	173	183	191	208	250
51000	106	117	112	111	118	129	145	151	151	156	168	179	190	200	217	225
52000	108	119	115	116	122	133	142	150	157	164	174	186	198	209	225	233
53000	111	121	119	120	127	137	147	155	162	170	180	192	205	216	227	242
54000	114	123	122	124	131	141	151	161	168	176	186	199	213	221	237	250
55000	117	125	126	128	135	145	155	165	173	182	192	205	221	237	250	250
56000	109	120	116	117	124	134	144	152	158	166	176	188	200	212	228	237
57000	112	122	122	122	129	139	149	157	165	173	183	195	209	223	233	247
58000	116	125	124	127	133	143	153	163	171	180	190	203	218	233	233	247

F4E AIRCRAFT
ALTITUDE-15000 FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	0	10	20	30	40	50	60	OPAC INDEX	90	100	110	120	130	140
30000	24.3	27.8	30.5	32.3	33.4	34.5	36.1	38.6	41.7	44.8	47.3	49.5	50.5	52.2
31000	25.0	28.6	31.5	33.2	34.3	35.5	37.2	39.7	42.9	46.1	48.6	49.9	50.7	55.8
32000	25.7	29.4	32.3	34.1	35.3	36.4	38.2	40.8	44.1	47.4	50.0	51.3	52.1	57.3
33000	26.4	30.2	33.2	35.1	36.2	37.4	39.3	42.0	45.3	48.7	51.3	52.7	53.6	58.9
34000	27.1	31.0	34.1	36.0	37.2	38.4	40.3	43.1	46.5	50.4	52.7	55.1	55.4	61.4
35000	27.8	31.8	35.0	36.9	38.2	39.4	41.3	44.2	47.7	51.3	54.1	55.5	55.6	62.0
36000	28.5	32.6	35.9	37.9	39.1	40.4	42.4	45.3	48.9	52.6	54.6	56.9	57.0	57.6
37000	29.2	33.4	36.7	38.8	40.1	41.4	43.4	46.4	50.1	53.9	56.8	58.2	58.4	65.1
38000	29.9	34.2	37.6	39.7	41.0	42.4	44.5	47.5	51.3	55.1	58.1	59.6	59.8	60.7
39000	30.6	35.0	38.5	40.6	42.0	43.4	45.5	48.6	52.5	56.4	59.5	61.0	61.2	62.1
40000	31.3	35.8	39.4	41.6	43.0	44.4	46.5	49.7	53.7	57.7	60.9	62.4	62.6	68.2
41000	32.4	37.1	40.7	43.0	44.4	45.9	48.2	51.5	55.6	59.7	63.6	64.0	64.8	65.7
42000	33.3	38.1	41.9	44.2	45.7	47.2	49.5	52.9	57.1	61.4	64.7	66.7	67.5	74.3
43000	34.2	39.2	43.0	45.4	46.9	48.5	50.9	54.3	58.7	63.1	66.5	68.2	69.1	76.3
44000	35.1	40.2	44.2	46.6	48.2	49.8	52.2	55.8	60.2	64.7	68.3	70.0	70.3	76.3
45000	36.0	41.2	45.3	47.8	49.4	51.1	53.6	57.2	61.6	66.4	70.0	71.8	72.1	73.1
46000	37.0	42.3	46.5	49.1	50.7	52.4	54.9	58.7	63.4	68.1	71.6	73.7	74.9	82.4
47000	37.9	43.3	47.6	50.3	51.3	53.0	56.3	60.1	64.9	69.8	73.6	75.5	76.6	84.4
48000	38.8	44.4	48.8	51.5	53.2	54.9	57.6	61.2	65.2	71.5	75.3	77.3	78.6	86.4
49000	39.7	45.4	49.9	52.7	54.4	56.2	59.0	63.0	66.2	73.1	77.1	79.1	79.4	80.5
50000	40.6	46.4	51.0	53.9	55.7	57.5	60.3	64.5	69.5	74.6	78.9	81.2	81.2	90.5
51000	40.8	47.7	51.3	54.2	56.0	57.8	60.7	64.8	69.7	75.2	79.3	81.4	81.7	82.8
52000	41.9	48.0	52.7	55.7	57.5	59.4	62.3	66.0	71.9	77.3	81.5	83.0	83.9	93.4
53000	43.0	49.2	54.4	57.1	59.0	61.0	63.9	67.3	73.2	79.3	83.6	85.8	86.1	87.2
54000	44.1	50.4	55.2	58.7	60.7	62.7	65.8	70.3	75.9	81.5	86.0	88.3	88.7	90.1
55000	45.2	51.6	56.9	61.3	62.5	64.7	68.0	72.6	78.4	84.2	88.6	91.4	92.2	94.0
56000	46.3	52.7	58.3	62.0	64.4	66.8	70.2	74.0	78.9	84.9	89.1	91.7	94.4	96.0
57000	47.4	53.8	59.7	63.7	66.3	68.8	72.4	77.4	83.4	89.5	93.5	95.5	99.1	101.9
58000	48.5	54.9	61.2	65.4	68.2	70.9	74.6	79.7	85.6	92.2	97.3	100.6	102.6	105.9

F4E AIRCRAFT
ALTITUDE-15000 FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER HOUR POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	964	856	773	747	726	698	664	629	602	563	524	507	492		
31000	896	853	799	763	744	719	692	658	624	597	577	561	536	503	488
32000	888	845	792	756	734	713	686	653	619	592	572	556	532	499	484
33000	860	838	785	750	727	707	680	647	614	587	567	547	527	495	480
34000	872	930	776	743	724	704	674	641	608	582	563	546	523	491	476
35000	864	823	771	736	714	694	668	636	603	577	558	531	519	487	472
36000	856	715	764	757	723	704	688	662	630	598	572	537	517	483	468
37000	848	847	750	716	695	675	656	625	593	567	548	532	509	479	464
38000	840	832	792	743	710	698	669	644	613	582	562	543	527	495	460
39000	832	785	736	703	682	663	636	608	577	552	533	517	496	466	452
40000	824	816	777	729	690	675	656	632	602	572	547	526	513	491	462
41000	816	808	770	722	690	669	650	626	597	566	542	523	503	487	463
42000	800	752	715	683	662	644	620	591	561	537	518	503	487	463	444
43000	792	754	709	676	650	637	614	585	556	532	514	496	475	455	436
44000	784	747	701	673	649	631	608	580	551	526	509	494	473	454	432
45000	776	739	694	663	643	625	602	574	545	521	501	489	469	442	428
46000	768	732	687	650	630	619	596	568	540	516	499	484	464	436	424
47000	760	724	684	649	633	612	590	563	535	511	494	479	460	434	420
48000	752	717	673	643	623	606	584	557	530	506	489	474	455	430	416
49000	744	709	666	636	617	600	578	552	524	501	484	470	451	426	412
50000	736	701	659	629	614	593	572	546	521	501	489	469	442	408	
51000	728	694	652	623	604	587	566	540	514	491	474	456	436	404	
52000	686	688	617	586	545	516	507	501	486	469	455	437	416	400	
53000	680	614	583	538	609	591	574	554	529	503	481	465	433	410	396
54000	671	614	631	603	584	568	548	524	498	476	456	436	416		
55000	666	624	596	573	562	542	518	493	471	455	441	424	402	386	
56000	660	624	589	571	556	530	512	488	460	445	430	419	396	384	
57000	656	617	589	563	549	526	507	482	462	445	431	415	394	380	
58000	649	614	583	538	603	584	568	548	524	498	476	456	436		

F4E AIRCRAFT
ALTITUDE-1500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	C	2	3	4	5	6	7	8	9	10	11	12	13	14	
30000	70	87	70	64	70	81	91	92	94	93	97	104	105	102	123
31000	73	89	73	66	73	84	94	95	96	95	103	111	112	115	127
32000	75	92	75	68	72	86	94	95	96	95	103	111	112	116	131
33000	77	95	77	70	77	89	96	97	98	97	106	111	115	112	135
34000	80	98	80	72	90	92	99	101	99	102	109	110	119	115	139
35000	82	100	82	75	83	95	103	104	104	105	114	123	125	122	145
36000	84	102	85	79	86	96	106	108	108	111	119	128	131	129	152
37000	86	103	86	82	90	102	110	112	113	115	116	125	134	136	159
38000	89	105	91	86	93	105	113	115	116	116	122	130	139	144	166
39000	91	107	94	89	97	108	117	118	117	117	127	135	145	152	173
40000	93	108	97	93	100	112	120	120	120	120	132	132	140	150	180
41000	96	110	100	96	104	115	124	124	124	124	137	146	150	163	187
42000	98	112	103	100	107	116	127	127	127	127	133	142	151	167	194
43000	100	114	106	104	111	121	131	131	131	131	147	156	167	176	201
44000	103	115	109	107	114	125	134	134	134	134	146	152	161	172	191
45000	105	117	111	111	119	126	136	136	136	136	157	166	178	189	215
46000	108	119	115	115	122	132	142	142	142	142	158	173	182	197	224
47000	111	121	116	119	120	136	156	156	156	156	162	169	179	192	232
48000	114	123	122	124	131	140	151	151	151	151	167	176	186	198	241
49000	117	125	126	128	135	145	155	155	155	155	173	182	192	205	250
50000	119	127	129	133	139	149	159	159	159	159	179	188	199	229	256
51000	122	129	132	136	143	152	163	174	174	174	194	204	216	235	266
52000	125	131	136	141	147	156	167	179	179	179	190	200	211	243	274
53000	128	133	139	145	151	160	171	183	183	183	195	206	217	251	283
54000	130	135	143	149	150	164	176	188	188	188	204	212	223	258	282
55000	133	137	146	153	160	168	180	193	193	193	206	218	230	262	291
56000	126	132	137	142	148	157	168	180	180	180	191	202	213	247	277
57000	129	134	141	147	153	162	173	187	187	187	197	208	220	254	286
58000	132	136	145	151	151	166	178	191	191	191	204	215	227	251	287

F4E AIRCRAFT
ALTITUDE-17500, FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	289	330	363	396	409	429	456	495	532	561	575	577	585	593	604
31000	298	342	374	395	408	422	442	473	510	549	576	593	596	604	604
32000	307	351	386	407	421	435	456	487	526	566	596	612	614	622	622
33000	316	362	398	420	434	446	470	502	542	583	614	650	32	641	705
34000	325	372	419	432	446	461	484	517	558	632	649	651	660	725	725
35000	335	383	421	444	459	474	497	531	574	617	650	657	669	678	746
36000	344	393	432	457	472	487	511	546	590	534	668	680	686	697	767
37000	353	404	444	469	484	500	525	561	605	651	686	716	716	787	787
38000	362	415	456	481	497	513	538	575	621	668	704	725	735	806	806
39000	372	425	467	493	510	527	552	590	637	685	722	744	753	828	828
40000	391	436	479	506	522	540	566	605	653	702	740	759	762	772	849
41000	392	446	493	524	538	555	582	622	672	722	762	781	784	795	874
42000	402	460	506	534	552	570	597	638	689	741	781	802	804	815	896
43000	412	472	518	547	565	584	613	655	707	760	801	822	825	836	919
44000	422	483	531	561	579	599	628	671	724	778	821	842	842	856	942
45000	433	495	544	574	593	613	643	687	742	797	841	862	865	877	964
46000	442	505	550	566	608	628	659	704	764	817	861	884	889	903	992
47000	453	515	570	604	627	649	681	728	785	844	890	915	924	943	1035
48000	464	526	584	621	646	669	703	752	812	876	930	959	982	1070	1070
49000	475	533	598	633	655	690	725	775	836	897	947	977	993	1022	1121
50000	486	550	613	655	683	710	747	799	861	924	975	1008	1028	1062	1164
51000	489	553	617	660	689	716	754	806	869	932	983	1017	1036	1073	1176
52000	51	565	634	678	749	736	777	833	895	959	1013	1049	1074	1114	1221
53000	512	577	645	695	728	759	800	855	921	987	1042	1081	1110	1155	1266
54000	524	585	661	713	743	780	822	880	947	1015	1072	1113	1146	1197	1310
55000	535	593	776	730	767	801	845	904	973	1043	1101	1145	1182	1236	1355
56000	521	585	658	709	743	775	817	874	941	1009	1065	1106	1136	1187	1300
57000	534	593	674	729	766	804	843	902	971	1040	1099	1142	1179	1234	1351
58000	547	612	691	749	786	824	869	930	1001	1072	1132	1179	1224	1281	1461

F4E AIRCRAFT
ALTITUDE-17500 FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 1000 POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	DRAG INDEX	70	80	90	100	110	120	130	140
31000	956	949	851	813	769	767	737	700	663	634	614	596	570	533	516	
31000	946	900	843	805	761	759	730	69*	657	628	603	59*	565	528	513	
32000	937	891	832	797	77*	752	723	687	651	622	602	582	559	523	506	
33000	927	863	826	789	760	74*	716	660	645	616	596	579	55*	519	504	
34000	918	874	819	781	758	737	708	67*	639	610	591	574	549	514	499	
35000	908	865	810	773	751	729	701	667	632	604	585	568	543	509	494	
36000	899	856	802	765	722	694	660	626	598	568	542	538	502	489		
37000	889	847	793	757	712	687	654	620	593	563	533	503	473	453	430	
38000	880	830	785	750	727	687	650	647	614	587	567	531	507	495	465	
39000	870	829	777	742	720	692	673	640	608	581	562	545	522	491	475	
40000	861	820	768	734	712	692	666	634	601	575	556	540	517	485	471	
41000	852	811	760	726	704	68*	659	627	595	569	550	534	511	480	466	
42000	842	802	752	718	697	677	652	620	589	563	544	526	503	476	461	
43000	833	793	744	710	689	669	644	61*	583	557	538	523	501	471	456	
44000	823	784	735	702	681	662	637	607	576	551	533	517	496	466	452	
45000	814	775	727	694	674	655	630	600	570	545	527	511	490	461	447	
46000	804	766	719	686	655	647	623	594	564	539	521	505	482	455	442	
47000	795	757	710	678	655	640	616	587	553	523	515	500	480	452	437	
48000	785	748	712	671	651	632	609	581	552	522	509	494	474	453		
49000	776	739	694	663	641	625	602	574	545	521	504	489	469	442	426	
50000	766	730	665	635	617	595	567	539	515	498	483	465	437	423		
51000	757	721	677	647	627	610	588	561	533	509	492	477	458	433	416	
52000	747	712	669	639	620	592	560	537	507	482	466	446	428	414		
53000	738	703	661	631	612	595	567	530	500	480	460	442	423	409		
54000	728	694	652	623	604	587	566	531	501	475	450	432	416	404		
55000	719	685	644	615	597	560	559	534	503	486	469	455	437	413	399	
56000	709	676	636	607	583	572	552	527	502	484	463	449	432	403		
57000	700	667	627	599	581	563	545	521	496	474	457	443	426	404	390	
58000	690	658	619	591	573	557	538	514	489	468	451	436	421	399	365	

F4E AIRCRAFT
ALTITUDE 20000 FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	0	10	20	30	40	50	60	70	80	DRAG INDEX	90	100	110	120	130	140
30000	84	101	84	78	82	97	105	107	110	116	112	116	127	130	128	151
31000	86	103	86	82	83	101	109	112	113	116	122	136	133	137	136	159
32000	89	105	91	86	93	105	113	117	116	122	122	136	144	145	145	167
33000	92	107	95	90	97	109	117	121	123	126	129	133	146	152	154	175
34000	94	109	98	94	101	113	121	126	129	142	152	159	167	163	163	183
35000	97	111	101	98	105	117	125	131	134	139	148	159	167	172	191	
36000	100	113	105	102	112	120	130	135	139	145	151	160	165	170	170	
37000	102	115	108	106	114	124	134	140	145	150	157	166	170	169	198	215
38000	105	117	111	111	113	128	138	144	149	155	163	172	164	196	207	223
39000	106	119	115	115	122	132	142	149	155	163	172	181	191	204	216	231
40000	111	121	118	118	119	125	136	146	154	161	169	178				
41000	113	123	121	123	130	140	150	156	166	174	184	197	211	225	239	
42000	116	125	125	127	134	143	154	163	172	180	190	203	216	234	247	
43000	116	127	126	131	133	147	158	168	177	186	196	211	226	243	255	
44000	121	129	131	135	142	151	162	172	182	192	203	216	233	252	263	
45000	124	131	132	139	146	155	165	177	186	198	209	222	240	260	271	
46000	128	134	140	145	152	161	172	184	196	206	218	232	254	274	284	
47000	131	136	144	150	157	165	177	190	202	214	225	240	260	284	293	
48000	134	148	148	155	161	170	181	191	195	209	221	232	247	269	295	303
49000	136	141	152	160	165	174	186	196	201	215	226	240	255	278	306	313
50000	141	143	156	165	171	179	191	206	222	235	247	263	287	317	322	
51000	144	145	150	170	176	186	196	212	228	242	254	270	295	327	332	
52000	147	148	164	175	181	188	203	216	235	249	261	276	305	336	342	
53000	151	150	168	169	169	193	206	223	241	256	269	286	314	349	352	
54000	154	152	172	185	191	194	211	229	248	263	276	293	323	359	361	
55000	157	155	176	194	195	202	215	234	254	270	283	301	332	370	371	
56000	151	150	168	160	166	193	206	224	241	250	269	286	314	349	352	
57000	154	153	173	166	192	199	212	234	249	257	277	295	325	362	363	
58000	158	156	178	192	197	204	217	236	256	272	286	304	335	374	374	

F4E AIRCRAFT
ALTITUDE-20000 FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	0	10	20	30	40	50	60	70	80	DRAG INDEX		90	100	110	120	130	140
										0.0	0.0						
30000	329	376	*14	437	451	466	489	522	564	0.06	0.39	656	656	667	667	735	
31000	346	389	*23	452	467	*82	506	544	583	0.27	0.61	678	681	690	690	759	
32000	352	412	*42	467	482	498	523	559	593	0.03	0.03	701	703	713	713	784	
33000	363	*15	*56	*82	498	514	522	569	602	0.69	1.08	725	726	736	736	809	
34000	374	*26	*71	497	511	531	556	595	642	0.22	0.59	728	746	749	759	835	
35000	386	*11	*65	512	529	547	573	613	651	0.11	0.51	755	769	772	782	860	
36000	397	*34	*99	527	545	563	590	631	661	0.32	0.72	792	794	794	794	865	
37000	409	*27	517	542	560	579	607	649	670	0.53	0.94	814	817	826	826	911	
38000	420	*30	528	557	576	595	624	667	697	0.74	1.16	837	844	851	851	936	
39000	431	*35	542	573	592	611	641	685	720	0.94	1.36	858	863	874	874	961	
40000	443	*16	557	589	609	630	660	706	736	0.9	0.65	887	891	906	906	995	
41000	454	517	606	626	651	683	730	766	806	0.96	0.93	918	927	947	947	1040	
42000	465	529	606	624	646	672	716	755	795	0.74	0.92	922	925	933	933	1064	
43000	477	541	601	641	667	693	729	779	804	0.01	0.51	951	982	999	999	1026	
44000	488	552	615	658	687	714	751	803	866	0.29	0.80	1014	1034	1054	1054	1172	
45000	500	564	630	676	705	735	774	826	892	0.56	1.01	1046	1070	1110	1110	1216	
46000	510	574	643	692	724	755	795	850	916	0.81	1.036	1074	1103	1147	1147	1257	
47000	523	588	660	712	740	779	821	878	945	1.013	1.070	1111	1143	1194	1194	1307	
48000	536	601	676	731	769	803	847	906	975	1.04	1.103	1147	1187	1240	1240	1357	
49000	549	614	693	751	791	827	873	933	1.004	1.075	1.136	1183	1227	1267	1267	1447	
50000	562	627	714	813	851	896	961	1.034	1.107	1.169	1.219	1265	1333	1458	1458		
51000	575	640	726	791	835	875	924	984	1.064	1.138	1.203	1255	1306	1380	1509		
52000	588	654	743	811	857	899	950	1.017	1.093	1.170	1.236	1292	1347	1426	1556		
53000	601	667	760	831	880	923	976	1.044	1.163	1.241	1.269	1.326	1.388	1.473	169		
54000	614	680	776	851	902	947	1.002	1.072	1.152	1.232	1.303	1.364	1.426	1.513	1659		
55000	626	693	793	870	924	971	1.028	1.100	1.182	1.264	1.330	1.400	1.466	1.566	1709		
56000	641	668	761	832	884	924	978	1.046	1.124	1.213	1.271	1.330	1.390	1.475	1611		
57000	656	683	780	855	907	952	1.006	1.078	1.159	1.239	1.310	1.372	1.437	1529	1670		
58000	671	698	799	878	932	980	1.038	1.110	1.193	1.275	1.349	1.414	1.484	1583	1726		

F4E AIRCRAFT
ALTITUDE - 20000 FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	DRAG INDEX	70	80	90	100	110	120	130	140
30000	959	897	856	831	808	776	737	698	667	646	626	599	559	544		
31000	997	948	887	847	822	799	768	729	690	660	639	621	593	554	538	
32000	986	938	877	835	813	790	759	721	683	653	632	614	587	548	533	
33000	974	927	868	828	804	781	751	713	676	646	625	607	581	542	527	
34000	963	916	856	819	795	772	742	703	663	639	610	591	577	537	522	
35000	952	906	848	810	785	764	734	698	661	632	612	594	566	531	516	
36000	941	835	838	800	777	755	726	690	654	625	605	587	562	525	510	
37000	935	825	828	791	768	746	717	682	646	618	598	581	555	520	505	
38000	918	874	819	782	753	737	709	674	639	611	591	574	549	514	499	
39000	907	893	809	772	750	729	700	666	632	604	584	567	543	508	494	
40000	896	833	799	763	740	719	692	656	624	597	577	557	535	503	486	
41000	885	842	789	754	731	711	684	650	617	590	570	554	530	497	462	
42000	874	852	779	744	722	702	675	643	610	583	564	547	524	492	477	
43000	862	821	770	735	713	693	667	635	602	576	557	540	516	486	471	
44000	851	810	750	720	704	684	656	627	595	569	554	534	511	481	456	
45000	840	795	710	695	675	650	619	587	552	527	505	475	450			
46000	829	749	740	707	680	667	632	611	580	555	536	520	499	469	454	
47000	618	779	730	698	677	653	633	603	573	548	529	514	492	463	449	
48000	806	768	724	686	664	649	625	595	564	542	522	507	486	456	433	
49000	795	757	711	679	659	640	616	588	558	534	516	500	480	452	436	
50000	784	747	701	674	643	619	591	561	531	509	494	473	446	432		
51000	773	736	691	664	634	622	604	572	543	519	502	487	464	426		
52000	762	726	681	651	631	614	591	564	535	512	495	480	461	435	421	
53000	750	715	672	641	622	605	583	556	529	505	488	473	455	429	415	
54000	739	705	662	632	613	596	574	551	521	498	481	467	443	424	410	
55000	728	704	652	623	604	587	566	544	514	491	474	454	434	418	404	
56000	717	682	613	592	579	558	533	507	484	468	443	436	412	398		
57000	706	673	604	580	569	549	525	500	477	461	447	436	417	393		
58000	694	662	595	577	561	541	517	492	470	454	430	410	387	367		

F4E AIRCRAFT
ALTITUDE-22500 FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	Climb Index									
	0	10	20	30	40	50	60	70	80	90
50000	0	10	20	30	40	50	60	70	80	90
51000	95	109	98	95	102	113	122	126	129	134
52000	98	-12	102	99	107	118	127	132	136	141
53000	101	-14	105	102	111	122	131	137	142	148
54000	104	-16	110	109	116	127	136	143	148	155
55000	107	-19	114	114	121	131	141	153	162	172
56000	111	-21	118	119	129	136	146	154	161	169
57000	114	-23	122	124	131	141	151	160	168	176
58000	117	-26	126	129	136	145	156	165	174	183
59000	120	-28	130	134	141	150	161	171	181	190
60000	124	-30	134	139	145	154	162	177	187	197
61000	127	-33	138	144	150	159	170	182	194	204
62000	130	-35	143	149	155	164	175	185	196	206
63000	133	-37	147	151	160	168	180	193	204	214
64000	136	-40	152	158	165	173	185	199	213	225
65000	140	-42	155	163	170	178	190	204	219	232
66000	143	-45	159	169	174	192	194	210	225	239
67000	151	-50	169	180	185	194	206	217	227	237
68000	155	-53	174	187	192	199	212	232	250	266
69000	159	-56	177	179	193	198	205	218	237	252
70000	161	-57	181	184	199	205	212	227	244	260
71000	169	-57	190	190	205	212	221	237	259	275
72000	173	-73	197	213	224	239	247	271	296	311
73000	174	-73	179	219	227	238	257	283	303	323
74000	180	-85	203	210	235	246	267	294	322	343
75000	185	-85	210	210	235	255	277	306	335	357
76000	190	-90	210	232	242	255	277	306	335	357
77000	195	-96	222	239	249	263	297	317	348	371
78000	196	-96	232	241	251	266	276	302	335	367
79000	197	-96	232	241	251	266	276	302	335	367
80000	205	-96	232	249	264	276	296	317	348	371
81000	191	217	233	243	256	278	307	336	359	377
82000	197	214	241	251	266	280	302	331	354	377
83000	203	232	249	264	276	296	317	348	371	395
84000	205	232	249	264	276	296	317	348	371	395
85000	205	232	249	264	276	296	317	348	371	395
86000	205	232	249	264	276	296	317	348	371	395
87000	205	232	249	264	276	296	317	348	371	395
88000	205	232	249	264	276	296	317	348	371	395

F4E AIRCRAFT
ALTITUDE-22500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	0	10	20	30	40	50	60	70	80	DRAG INDEX	90	100	110	120	130	140
30000	360	*12	*52	478	*93	510	535	571	617	653	699	717	726	729	729	729
31000	373	*26	*59	495	511	528	554	592	639	687	724	743	745	756	756	756
32000	386	*41	*85	512	529	546	573	612	661	711	749	771	782	802	802	802
33000	399	*56	501	529	547	565	592	633	683	734	774	794	808	823	834	834
34000	411	*71	517	546	564	583	611	653	705	758	799	820	834	846	846	846
35000	424	*85	533	563	582	601	631	674	727	782	824	846	849	860	860	860
36000	437	*00	554	580	600	619	650	694	750	806	849	871	874	886	886	886
37000	*50	*12	565	585	622	643	675	722	779	837	882	907	915	932	932	932
38000	463	*26	583	620	644	667	704	749	805	861	916	943	955	970	970	970
39000	399	*41	599	640	656	691	727	777	836	899	949	979	996	1025	1025	1025
40000	489	*56	516	559	638	715	753	805	867	930	982	1015	1036	1071	1071	1071
41000	502	*66	633	679	710	740	779	833	897	962	1016	1052	1077	1118	1118	1118
42000	515	*81	655	714	733	764	805	861	926	994	1050	1089	1119	1166	1166	1166
43000	529	*93	667	720	750	789	832	890	956	1027	1084	1127	1161	1214	1214	1214
44000	542	*07	634	741	779	814	859	919	989	1059	1119	1164	1203	1262	1262	1262
45000	555	*21	701	761	802	839	886	947	1019	1091	1153	1201	1245	1314	1314	1314
46000	568	*33	717	780	823	862	910	974	1046	1121	1185	1236	1284	1355	1355	1355
47000	582	*48	736	803	845	889	949	1005	1081	1157	1222	1277	1330	1407	1407	1407
48000	597	*63	755	825	873	916	969	1036	1111	1192	1260	1317	1376	1459	1459	1459
49000	611	*78	774	847	898	943	998	1068	1147	1227	1297	1358	1424	1511	1511	1511
50000	626	*93	792	870	923	970	1027	1099	1161	1262	1335	1398	1467	1564	1564	1564
51000	654	*21	329	913	971	1023	1083	1159	1245	1330	1407	1477	1556	1665	1665	1665
52000	671	*36	349	938	999	1053	1115	1194	1282	1369	1449	1522	1597	1723	1723	1723
53000	686	*51	874	952	1127	1083	1146	1228	1319	1409	1490	1567	1657	1781	1781	1781
54000	703	*66	892	987	1055	1113	1182	1265	1356	1450	1535	1617	1716	1852	1852	1852
55000	719	*99	920	1015	1085	1149	1223	1312	1409	1504	1594	1692	1818	1994	2209	2209
56000	709	*83	903	999	1067	1128	1196	1284	1379	1472	1559	1647	1757	1910	2099	2099
57000	726	*11	933	1028	1099	1165	1243	1333	1433	1529	1623	1726	1805	2060	2295	2295
58000	743	*14	962	1057	1131	1203	1287	1384	1487	1586	1686	1785	1973	2492	2492	2492

F4E AIRCRAFT
ALTITUDE-22200, FEET
FUEL CONSUMPTION RATE TABLE
RATES APE IN NAUTICAL MILES PER 1-G-U POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	70	80	DRAG INDEX	90	100	110	120	130	140
31000	1065	1113	947	904	878	853	819	777	735	0.73	0.73	0.73	0.73	0.73	0.73	0.73
31000	1052	1101	936	893	867	843	809	768	727	0.74	0.74	0.74	0.74	0.74	0.74	0.74
31000	1039	988	924	882	857	832	799	759	718	0.86	0.86	0.86	0.86	0.86	0.86	0.86
32000	1026	976	913	872	849	822	794	750	710	0.78	0.78	0.78	0.78	0.78	0.78	0.78
33000	1013	964	902	861	839	812	780	741	701	0.70	0.70	0.70	0.70	0.70	0.70	0.70
34000	1001	952	891	850	825	802	770	732	693	0.62	0.62	0.62	0.62	0.62	0.62	0.62
35000	988	940	879	839	815	792	761	723	684	0.54	0.54	0.54	0.54	0.54	0.54	0.54
36000	975	927	858	829	805	782	751	714	675	0.46	0.46	0.46	0.46	0.46	0.46	0.46
37000	962	915	857	818	794	771	741	704	668	0.38	0.38	0.38	0.38	0.38	0.38	0.38
38000	949	902	842	807	784	761	732	695	659	0.30	0.30	0.30	0.30	0.30	0.30	0.30
39000	936	891	834	796	773	751	722	690	654	0.22	0.22	0.22	0.22	0.22	0.22	0.22
40000	923	879	823	780	763	741	712	677	642	0.14	0.14	0.14	0.14	0.14	0.14	0.14
41000	910	866	812	775	752	731	703	668	634	0.06	0.06	0.06	0.06	0.06	0.06	0.06
42000	897	854	900	764	742	721	693	659	625	0.17	0.17	0.17	0.17	0.17	0.17	0.17
43000	885	842	789	723	701	679	645	609	576	0.09	0.09	0.09	0.09	0.09	0.09	0.09
44000	872	830	778	743	721	690	664	634	608	0.01	0.01	0.01	0.01	0.01	0.01	0.01
45000	859	818	766	732	710	690	664	632	600	0.73	0.73	0.73	0.73	0.73	0.73	0.73
46000	846	805	725	721	700	684	657	623	591	0.65	0.65	0.65	0.65	0.65	0.65	0.65
47000	833	793	744	710	683	670	645	614	583	0.57	0.57	0.57	0.57	0.57	0.57	0.57
48000	820	781	733	700	679	660	635	605	574	0.49	0.49	0.49	0.49	0.49	0.49	0.49
49000	807	769	721	589	658	650	625	596	566	0.41	0.41	0.41	0.41	0.41	0.41	0.41
50000	794	757	678	658	639	610	587	558	533	0.33	0.33	0.33	0.33	0.33	0.33	0.33
51000	781	744	699	667	647	629	606	578	549	0.25	0.25	0.25	0.25	0.25	0.25	0.25
52000	769	732	687	657	637	613	593	569	541	0.17	0.17	0.17	0.17	0.17	0.17	0.17
53000	756	720	670	642	620	609	587	560	532	0.09	0.09	0.09	0.09	0.09	0.09	0.09
54000	743	708	663	635	615	599	577	551	524	0.01	0.01	0.01	0.01	0.01	0.01	0.01
55000	730	696	654	624	605	589	567	542	515	0.93	0.93	0.93	0.93	0.93	0.93	0.93
56000	717	642	614	593	578	558	533	517	495	0.85	0.85	0.85	0.85	0.85	0.85	0.85
57000	704	631	583	563	548	524	508	490	468	0.75	0.75	0.75	0.75	0.75	0.75	0.75

F4E AIRCRAFT
ALTITUDE-25,000 FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	C	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	104	116	109	108	115	126	135	142	147	154	163	174	185	194	211
31000	106	119	115	115	121	132	141	149	155	162	172	184	195	207	223
32000	112	122	120	121	128	138	148	156	163	171	181	194	207	220	235
33000	116	125	125	127	134	143	154	163	171	180	190	203	215	234	247
34000	120	128	130	133	140	149	160	170	180	189	199	213	229	247	259
35000	124	131	135	139	146	155	166	177	186	192	209	222	241	261	271
36000	128	136	140	145	152	161	172	184	196	205	216	232	252	274	284
37000	132	137	145	151	158	166	178	191	204	215	227	242	263	287	296
38000	136	139	150	158	164	172	184	198	212	224	236	251	274	300	308
39000	140	142	125	126	177	178	190	205	222	233	245	262	285	314	320
40000	144	145	160	170	176	184	196	212	228	242	254	270	296	327	332
41000	148	146	165	176	182	189	202	219	236	250	263	280	307	341	344
42000	152	151	170	182	186	195	208	226	244	259	272	289	318	354	356
43000	156	154	175	168	194	201	214	233	252	268	281	299	329	367	368
44000	160	157	180	195	200	207	220	240	260	277	291	309	341	361	381
45000	165	163	186	201	207	215	230	251	273	291	305	323	356	398	401
46000	170	178	202	218	226	236	255	281	306	326	342	361	395	442	454
47000	165	165	210	226	235	247	267	295	322	344	366	380	415	464	460
48000	191	192	218	234	244	257	280	309	339	361	378	398	434	486	506
49000	198	199	226	243	253	266	292	324	355	379	417	454	507	532	532
50000	204	207	233	251	262	278	305	336	371	396	415	436	473	529	538
51000	211	214	241	259	271	289	317	353	387	414	433	454	493	551	564
52000	217	221	249	268	284	299	329	367	394	414	451	473	512	573	610
53000	224	228	257	276	290	310	342	382	420	449	469	491	532	594	636
54000	230	236	265	284	299	322	354	396	436	467	487	510	551	616	662
55000	237	243	272	292	308	331	366	410	452	484	506	529	571	638	686
56000	236	242	272	292	307	330	365	409	451	483	504	527	569	636	666
57000	244	251	281	302	318	342	380	426	464	494	526	549	593	662	717
58000	252	260	290	312	329	355	395	434	471	504	525	572	615	688	X

F4E AIRCRAFT
ALTITUDE-25000. FEET
FUEL FOR CLIMB TABLE
U.S. AIR IN POUNDS.

WEIGHT	0	10	20	30	40	50	60	DPAG INDEX	80	90	100	110	120	130	140
30000	385	440	484	511	523	545	572	611	660	709	748	767	770	780	56
31000	399	436	542	530	547	565	593	633	684	735	775	795	798	609	689
32000	413	472	519	548	566	585	614	656	708	761	802	823	826	837	920
33000	427	483	537	567	586	606	626	656	708	732	767	830	851	854	952
34000	441	504	554	586	606	627	657	697	753	795	859	882	886	899	989
35000	455	520	572	618	633	652	685	732	790	846	895	921	930	950	1043
36000	469	533	590	629	654	678	713	752	822	882	931	960	974	1000	1097
37000	483	547	608	650	673	704	741	792	854	916	967	999	1018	1050	1152
38000	497	561	626	672	702	733	769	822	886	953	1022	1062	1101	1206	
39000	511	575	644	693	726	756	797	852	916	984	1039	1077	1106	1151	1261
40000	525	590	652	715	750	782	825	882	950	1018	1075	1116	1150	1201	1315
41000	541	606	683	739	778	812	857	917	987	1057	1116	1161	1204	1259	1376
42000	557	623	74	764	845	842	889	951	1024	1096	1158	1206	1251	1317	1440
43000	573	639	725	769	833	872	922	980	1060	1135	1199	1251	1302	1375	1503
44000	589	655	745	814	864	902	954	1020	1097	1174	1241	1296	1352	1432	1565
45000	605	572	766	836	888	932	986	1052	1134	1213	1282	1341	1403	1490	1626
46000	622	588	787	863	916	962	1018	1089	1171	1252	1323	1386	1454	1546	1690
47000	638	705	807	868	943	992	1050	1124	1208	1291	1365	1431	1504	1600	1753
48000	654	721	928	912	971	1022	1083	1159	1244	1330	1406	1476	1555	1664	1815
49000	670	738	849	937	998	1052	1115	1193	1281	1369	1448	1521	1605	1721	1878
50000	686	754	869	962	1026	1082	1147	1228	1318	1403	1489	1566	1656	1779	1941
51000	725	610	931	1026	1097	1163	1240	1331	1429	1525	1619	1721	1856	2051	2283
52000	745	842	965	1060	1134	1206	1291	1389	1492	1592	1693	1763	1841	2226	2511
53000	765	875	999	1094	1171	1251	1342	1447	1555	1659	1767	1855	1909	201	2739
54000	785	1033	1129	1208	1293	1394	1505	1617	1725	1841	1997	2235	2576	2967	
55000	805	940	1067	1163	1242	1337	1445	1563	1680	1792	1915	2099	2360	2751	3195
56000	825	972	1192	1197	1282	1380	1496	1622	1743	1856	1989	2180	2485	2926	3423
57000	845	1006	1136	1231	1319	1423	1548	1680	1805	1925	2063	2272	2511	3101	3651
58000	865	1039	1170	1265	1356	1467	1599	1738	1868	1991	2137	2376	2736	3276	x

F4E AIRCRAFT
ALTITUDE-25000 FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 1,000 POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
33000	1128	1172	1062	956	929	902	866	821	776	742	719	699	667	620	604
34000	1114	1059	989	944	917	891	855	811	767	733	711	691	659	613	597
35000	1099	1045	977	932	906	880	844	801	756	724	702	682	651	615	596
36000	1085	1031	964	924	894	868	834	791	748	715	693	674	643	598	582
37000	1070	1018	952	908	882	857	823	781	739	706	684	665	635	591	575
38000	1056	1004	939	896	870	846	812	770	729	697	675	656	625	584	568
39000	1042	951	926	884	859	834	801	764	726	688	648	618	576	541	518
40000	36000	377	914	872	847	823	790	750	710	679	658	639	610	569	554
41000	3750	1013	963	901	860	832	812	780	740	701	670	649	630	602	562
42000	955	309	851	812	783	766	736	700	663	634	614	596	570	533	516
43000	941	895	834	800	777	755	726	690	654	625	605	587	562	525	510
44000	926	882	926	765	743	715	684	644	616	596	579	554	518	503	496
45000	912	867	813	776	753	732	704	669	635	607	587	570	545	511	496
46000	895	354	800	764	742	721	693	659	625	598	578	561	537	504	489
47000	883	341	783	752	734	709	682	649	616	589	569	553	529	496	482
48000	869	327	775	744	718	698	672	639	606	580	561	544	521	485	474
49000	854	913	763	728	707	687	661	629	597	571	552	536	513	482	467
50000	840	800	750	716	693	675	650	619	587	562	543	527	505	475	460
51000	826	786	737	704	683	664	639	609	576	553	534	516	497	467	453
52000	811	773	722	692	672	653	628	599	569	544	525	510	489	460	446
53000	797	759	712	680	660	641	618	589	559	535	517	501	481	453	436
54000	782	745	700	664	644	630	607	579	550	525	508	493	473	445	431
55000	768	732	687	656	632	619	596	568	540	516	499	484	464	438	424
56000	754	714	674	644	625	607	585	558	531	507	480	455	431	417	-
57000	739	705	662	632	613	596	574	548	521	498	467	448	424	410	-
58000	725	694	645	624	604	585	564	538	512	489	458	436	416	X	-

F4E AIRCRAFT
ALTITUDE 27500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	
30000	113	123	122	123	139	140	150	159	166	175	185	197	211	225
31000	118	127	128	131	137	147	157	167	177	186	196	209	225	242
32000	123	134	134	138	145	154	165	176	187	197	207	221	239	255
33000	128	134	140	146	153	161	173	185	197	206	219	233	253	270
34000	133	138	147	157	163	169	180	194	207	219	230	242	267	285
35000	138	141	153	161	168	176	188	202	217	230	242	257	281	315
36000	144	145	159	169	175	183	195	211	227	241	253	269	295	326
37000	149	149	166	177	183	190	203	220	237	252	264	281	309	342
38000	154	152	172	185	191	198	211	229	247	263	276	293	323	346
39000	159	156	178	192	193	205	218	237	258	277	287	305	337	361
40000	165	162	186	200	207	214	229	250	272	289	303	322	354	376
41000	171	169	193	208	210	224	241	264	288	306	321	340	373	417
+2000	177	176	204	217	222	235	253	278	304	323	339	358	392	436
43000	184	183	208	225	233	245	265	292	319	340	356	376	411	475
+1000	190	191	216	233	242	255	277	305	335	357	374	397	430	500
45000	196	198	224	241	251	265	289	320	351	374	392	412	449	525
46000	207	210	236	254	266	282	309	344	378	403	422	443	481	537
+7000	215	219	246	265	277	295	325	362	398	425	445	476	506	565
+8000	223	228	256	275	289	309	340	380	418	447	467	490	530	592
+9000	232	237	266	286	309	326	356	398	439	469	490	523	555	633
50000	240	246	276	295	312	335	371	415	459	494	513	530	579	647
51000	246	254	284	305	321	345	384	431	476	510	532	556	599	669
52000	254	262	293	314	332	358	399	449	496	531	554	578	623	695
53000	262	271	302	325	344	372	415	467	516	553	577	604	647	722
54000	274	278	312	336	358	388	433	488	539	578	603	629	675	x
55000	278	285	321	348	372	404	452	509	563	603	630	656	703	x
56000	281	289	325	353	378	412	461	519	573	614	642	686	716	x
57000	290	298	336	367	394	431	482	543	604	644	672	700	x	x
58000	299	306	347	380	410	450	504	567	627	673	703	731	x	x

F4E AIRCRAFT
ALTITUDE-27500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	4.14	4.74	5.21	5.50	5.63	5.87	6.16	6.58	7.14	7.63	8.05	8.26	8.29	8.44	9.23
31000	4.30	4.92	5.40	5.70	5.89	6.09	6.38	6.82	7.37	7.92	8.35	8.59	8.71	9.58	
32000	4.45	5.18	5.60	5.92	6.13	6.34	6.65	7.11	7.67	8.24	8.69	8.93	8.95	9.14	10.04
33000	4.60	5.24	5.79	6.16	6.39	6.62	6.96	7.44	8.02	8.62	9.09	9.36	9.47	9.69	10.64
34000*	4.76	5.39	5.99	6.39	6.66	6.91	7.27	7.77	8.37	8.99	9.46	9.79	9.95	1.024	11.24
35000	4.91	5.55	6.19	6.63	6.92	7.20	7.57	8.10	8.73	9.36	9.86	10.22	10.44	10.79	11.63
36000	5.07	5.71	6.39	6.87	7.14	7.46	7.88	8.43	9.06	9.73	10.28	10.65	10.92	11.35	12.43
37000	5.22	5.87	6.59	7.14	7.42	7.77	8.19	8.76	9.43	10.14	10.67	11.04	11.40	11.90	13.03
38000	5.37	6.02	6.78	7.34	7.71	8.05	8.50	9.09	9.78	10.48	11.07	11.51	11.89	12.45	13.63
39000	5.53	6.18	6.98	7.57	8.07	8.34	8.80	9.42	10.13	10.85	11.46	11.94	12.37	13.04	14.22
40000	5.68	6.34	7.18	7.81	8.24	8.63	9.11	9.75	10.46	11.22	11.86	12.37	12.65	13.56	14.82
41000	5.83	6.53	7.43	8.11	8.57	8.99	9.50	10.16	10.93	11.69	12.36	12.91	13.45	14.26	15.56
42000	6.06	6.73	7.67	8.40	8.90	9.34	9.88	10.57	11.36	12.15	12.84	13.44	14.05	14.94	16.31
43000	6.25	6.92	7.92	8.69	9.22	9.69	10.26	10.98	11.79	12.61	13.33	13.97	14.65	15.62	17.05
44000	6.44	7.11	8.10	8.98	9.55	10.04	10.64	11.36	12.23	13.07	13.82	14.50	15.25	16.33	17.79
45000	6.63	7.31	8.40	9.27	9.87	10.43	11.11	11.79	12.66	13.52	14.30	15.03	15.84	16.98	18.52
46000	6.84	7.52	8.60	9.58	10.22	10.77	11.42	12.23	13.13	14.02	14.83	15.64	16.43	17.71	19.31
47000	7.02	7.71	8.91	9.80	10.53	11.12	11.80	12.63	13.56	14.47	15.32	16.14	17.11	18.45	20.16
48000	7.20	8.11	9.22	10.17	10.87	11.51	12.26	13.16	14.13	15.08	16.97	17.86	18.76	20.55	22.23
49000	7.38	8.31	9.23	10.48	11.21	11.91	12.73	13.69	14.70	15.69	16.67	17.81	19.40	21.64	24.31
50000	7.56	8.61	9.84	10.79	11.55	12.31	13.20	14.22	15.27	16.29	17.34	18.65	20.54	23.24	26.39
51000	7.94	9.23	10.49	11.44	12.25	13.13	14.17	15.32	16.46	17.56	18.75	20.9	22.92	25.50	30.72
52000	8.17	9.50	10.86	11.83	12.67	13.63	14.76	15.98	17.18	18.32	19.60	21.46	24.35	28.56	x
53000	8.40	9.85	11.27	12.22	13.10	14.12	15.34	16.65	17.89	19.08	20.44	22.49	25.79	30.56	x
54000	8.63	10.45	11.60	12.61	13.52	14.62	15.93	17.31	18.61	19.84	21.29	23.54	27.22	x	x
55000	8.85	10.72	12.05	13.00	13.94	15.12	16.52	17.98	19.33	20.60	22.14	24.59	28.65	x	x
56000	9.22	11.32	12.67	13.62	14.61	15.90	17.45	19.03	20.6	21.04	23.48	26.25	30.92	x	x
57000	9.46	11.71	13.09	14.03	15.06	16.43	18.07	19.73	21.22	22.61	24.37	27.36	x	x	x
58000	9.70	12.11	13.50	14.44	15.51	16.95	18.68	20.43	21.97	23.41	25.27	28.46	x	x	x

F4E AIRCRAFT
ALTITUDE-27500. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	6	10	20	30	40	50	60	70	80	DRAG INDEX	90	100	110	120	130	140
30000	1194	1134	1060	1011	982	954	915	867	820	783	760	739	704	673	637	
31000	1178	1119	1046	998	974	942	903	856	809	773	750	729	692	645	629	
32000	1162	1105	1032	985	957	929	892	845	803	763	740	720	680	637	621	
33000	1146	1090	1016	972	944	917	880	834	788	753	731	710	677	629	613	
34000	1130	1075	1004	958	931	904	868	823	778	744	721	701	663	621	605	
35000	1114	1060	990	955	918	892	856	811	768	734	711	691	659	613	597	
36000	1099	1045	976	932	895	879	844	804	769	747	714	692	650	605	589	
37000	1083	1030	962	919	892	867	832	789	754	736	704	682	642	597	581	
38000	1067	1015	949	905	879	854	820	779	744	726	694	672	633	589	573	
39000	1051	1000	935	892	867	842	808	767	734	716	684	662	624	581	566	
40000	1035	995	921	879	854	829	796	756	726	704	674	653	615	573	558	
41000	1019	970	907	866	831	817	785	745	705	674	653	634	606	565	550	
42000	1004	955	893	853	828	804	773	734	695	664	643	625	597	557	542	
43000	988	940	879	839	815	792	761	723	684	654	635	615	588	549	534	
44000	972	925	865	826	802	779	749	711	674	644	624	606	579	541	526	
45000	956	910	852	813	789	767	737	700	664	634	614	596	574	533	518	
46000	940	895	838	800	776	754	725	689	653	624	604	587	561	525	510	
47000	924	890	824	787	764	742	713	678	643	614	595	578	552	517	502	
48000	909	855	810	773	751	727	701	667	632	605	585	568	544	509	494	
49000	893	850	796	760	738	717	690	656	622	595	575	559	535	501	486	
50000	877	835	782	747	725	704	676	645	612	585	566	549	525	493	478	
51000	861	820	768	734	712	692	666	634	601	575	556	536	517	485	470	
52000	845	805	754	720	699	679	654	623	591	565	546	525	494	477	x	
53000	829	790	741	707	686	667	642	611	580	555	536	521	499	469	x	
54000	813	775	727	694	673	654	630	600	570	545	527	511	490	x	x	
55000	798	754	713	681	661	642	618	589	563	535	517	502	481	x	x	
56000	782	745	699	668	648	629	606	578	549	525	507	485	462	x	x	
57000	766	730	685	654	635	617	594	567	539	515	498	472	x	x	x	
58000	750	715	671	641	622	604	583	556	528	505	488	463	x	x	x	

F4E AIRCRAFT
ALTITUDE-3000 FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	C	DRAG INDEX										140			
		10	20	30	40	50	60	70	80	90	100				
30000	126	132	137	142	149	156	169	181	192	202	213	228	245	266	278
31000	132	137	145	152	158	167	176	191	204	216	227	242	263	286	296
32000	138	141	153	161	167	175	187	202	216	229	241	257	280	306	315
33000	144	146	160	170	177	184	197	213	229	242	256	271	297	325	333
34000	150	150	168	180	186	193	206	223	241	256	269	286	314	349	351
35000	157	155	176	169	195	202	215	234	253	269	282	300	331	369	374
36000	163	161	184	199	205	212	226	247	268	286	300	316	350	394	394
37000	171	169	193	208	215	224	241	264	288	306	321	340	373	417	424
38000	179	178	202	216	226	237	256	281	307	327	342	362	396	443	455
39000	186	186	212	223	237	249	271	298	326	348	364	384	413	468	485
40000	194	221	236	248	261	285	315	345	366	385	406	442	494	516	516
41000	202	230	247	258	274	299	332	364	389	407	427	465	519	547	547
42000	209	212	239	257	269	286	324	349	383	409	428	449	483	545	577
43000	217	221	248	267	280	298	328	366	402	430	449	471	511	571	608
44000	225	229	258	277	290	311	343	383	421	451	471	493	534	596	638
45000	232	238	267	286	301	323	357	400	441	471	492	515	557	622	669
46000	236	242	271	291	316	329	364	406	454	481	503	520	566	634	684
47000	246	253	283	304	320	345	383	430	474	508	530	554	597	667	723
48000	255	264	295	316	334	360	401	451	499	534	557	582	626	700	x
49000	265	302	302	330	349	379	423	476	526	563	586	613	659	735	x
50000	275	283	318	344	367	399	446	502	555	595	621	647	694	x	x
51000	285	292	330	359	385	420	469	528	584	626	654	681	723	x	x
52000	294	302	341	374	402	440	493	555	613	658	687	715	x	x	x
53000	304	311	353	368	420	460	516	581	643	689	726	x	x	x	x
54000	314	321	365	463	477	481	540	604	672	721	x	x	x	x	x
55000	324	330	376	418	455	501	563	634	701	x	x	x	x	x	x
56000	332	338	386	434	471	519	583	656	726	x	x	x	x	x	x
57000	344	349	401	448	491	542	612	689	722	x	x	x	x	x	x
58000	356	361	412	466	513	569	640	722	x	x	x	x	x	x	x

FILE AIRCRAFT
ALTITUDE-30000. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX						90	100	110	120	130	140
	20	30	40	50	60	70						
30000	0	10	20	30	40	50	60	70	80	90	100	110
31000	455	518	572	618	630	652	685	732	790	948	895	921
32000	472	536	595	634	660	685	720	770	930	991	940	985
33000	490	554	617	661	690	717	755	807	970	985	1019	1040
34000	507	572	640	688	720	750	790	842	910	976	1030	1040
35000	525	590	662	715	754	782	825	862	950	1.16	1.075	1.179
36000	542	608	685	742	780	815	860	920	990	1.16	1.116	1.138
37000	560	625	707	768	810	848	895	957	1030	1103	1165	1214
38000	577	643	730	795	840	880	930	995	1073	1145	1211	1263
39000	595	661	752	822	870	913	965	1032	1110	1187	1257	1312
40000	512	679	775	849	900	945	1000	1070	1150	1230	1300	1361
41000	630	697	797	876	930	978	1035	1107	1190	1272	1345	1410
42000	653	720	827	911	969	1023	1081	1157	1227	1304	1374	1452
43000	674	742	854	943	1005	1060	1123	1202	1291	1379	1458	1533
44000	695	763	881	976	1042	1099	1166	1247	1339	1413	1505	1592
45000	716	795	915	1011	1081	1144	1217	1306	1402	1490	1580	1681
46000	738	935	1047	1120	1193	1267	1340	1427	1517	1607	1705	1803
47000	759	1065	986	1084	1159	1236	1326	1429	1525	1623	1721	1820
48000	801	934	1025	1120	1193	1261	1336	1421	1516	1611	1710	1810
49000	822	969	1097	1192	1277	1354	1435	1522	1616	1711	1811	1910
50000	843	1004	1133	1228	1316	1420	1514	1676	1801	1920	2058	2202
51000	872	1050	1162	1277	1369	1482	1617	1758	1890	2015	2163	2346
52000	897	1191	1225	1319	1415	1536	1681	1832	1960	2100	2256	2531
53000	922	1132	1267	1362	1461	1590	1745	1903	2046	2160	2348	2717
54000	946	1172	1310	1404	1503	1645	1809	1975	2124	2263	2469	2903
55000	971	1213	1352	1447	1557	1699	1872	2048	2202	x	x	x
56000	996	1253	1394	1489	1593	1752	1935	2119	2279	x	x	x
57000	1125	1302	1445	1540	1657	1817	2012	2206	2366	x	x	x
58000	1155	1351	1496	1591	1710	1862	2066	2292	x	x	x	x

F4E AIRCRAFT
ALTITUDE-3000 FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	DRAG INDEX	80	90	100	110	120	130	140
30000	1256	1193	1114	1063	1033	1003	962	911	860	822	798	776	739	685	666
31000	1238	1177	1099	1048	1013	989	949	898	849	811	787	765	729	676	659
32000	1221	1160	1083	1034	1004	976	936	886	837	800	776	755	719	667	650
33000	1203	1143	1068	1019	990	962	922	874	826	789	765	744	709	656	642
34000	1186	1127	1052	1004	975	948	909	861	814	775	734	699	649	633	614
35000	1168	1110	1037	990	951	934	896	849	803	767	744	723	689	644	614
36000	1150	1094	1022	975	947	920	883	837	791	756	733	713	680	631	615
37000	1133	1077	1006	960	933	906	870	824	780	745	722	702	670	622	606
38000	1115	1060	991	946	919	892	856	812	786	754	734	712	692	660	643
39000	1098	1044	975	931	911	878	843	804	757	725	704	684	655	639	614
40000	1080	1027	960	916	890	865	830	787	745	712	690	671	640	596	580
41000	1062	1010	945	902	876	851	817	775	733	701	679	660	630	587	571
42000	1045	934	929	887	851	837	804	763	722	690	668	654	624	576	562
43000	1027	977	914	872	847	823	790	750	710	679	658	639	610	569	554
44000	1010	950	898	858	833	809	777	738	699	668	647	629	599	560	545
45000	992	944	583	643	613	795	764	726	687	657	636	618	590	551	536
46000	974	927	868	826	801	761	724	686	646	625	607	581	542	527	518
47000	957	910	852	814	794	757	738	701	664	635	615	597	571	534	518
48000	939	834	837	799	770	754	724	689	653	624	594	566	541	516	500
49000	922	877	821	784	761	740	711	676	641	613	593	575	551	525	500
50000	904	810	816	770	747	726	698	664	629	592	562	545	516	491	466
51000	886	844	791	755	733	712	685	652	618	591	571	555	531	506	481
52000	869	827	775	740	713	699	672	639	606	581	561	544	516	491	466
53000	851	810	760	726	704	684	656	627	595	569	550	530	506	481	456
54000	834	794	744	711	694	670	645	614	583	558	538	518	491	466	441
55000	816	777	729	696	675	656	632	602	572	542	516	491	466	441	416
56000	798	751	714	682	651	624	603	571	540	510	481	454	426	401	376
57000	781	744	696	667	647	626	606	577	547	517	486	456	426	401	376
58000	763	727	683	652	633	615	592	565	535	505	475	445	415	385	355

F4E AIRCRAFT FEET
ALTITUDE-32500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	
30000	143	145	159	169	175	179	185	193	205	223	241	255	268	285	313	348
31000	150	150	168	179	185	193	205	216	235	255	271	284	302	333	371	351
31100	157	155	177	190	196	203	216	231	252	274	292	306	324	357	399	372
32000	166	163	187	201	208	216	224	231	250	272	296	316	331	350	384	402
33000	175	173	197	203	220	230	244	264	284	310	340	356	375	410	429	436
34000	183	183	206	224	233	244	264	294	316	340	364	386	406	434	458	474
35000	192	193	218	235	245	258	281	311	340	363	380	400	436	467	506	
36000	201	203	229	246	257	272	298	330	362	387	404	425	450	482	517	
37000	210	212	240	256	269	286	314	350	384	414	434	454	489	529	546	
38000	218	222	250	269	282	301	331	369	406	434	464	493	523	553	575	
39000	227	232	261	280	294	315	346	386	426	456	486	516	546	576	605	
40000	236	242	272	292	307	330	365	409	451	482	514	547	577	609	636	
41000	246	253	283	303	320	344	383	430	474	507	530	563	597	627	657	
42000	255	263	294	315	333	359	400	450	497	532	556	584	623	654	694	
43000	264	273	305	325	347	376	420	473	522	560	584	619	655	684	731	
44000	273	282	316	342	364	396	442	496	550	590	616	641	668	x		
45000	275	283	318	345	367	399	446	502	555	595	622	648	669	695		
46000	287	294	332	362	385	424	474	534	590	632	661	688	735			
47000	298	305	346	379	409	448	498	565	624	670	700	728	x			
48000	310	316	364	396	429	472	529	596	659	717	739	x				
49000	321	327	373	414	450	496	557	627	693	x	x	x	x	x		
50000	343	349	400	447	490	542	610	667	x	x	x	x	x	x	x	
51000	358	363	417	469	510	573	645	727	x	x	x	x	x	x	x	
52000	372	377	435	491	543	604	680	x	x	x	x	x	x	x	x	
53000	387	391	453	513	569	634	715	x	x	x	x	x	x	x	x	
54000	402	405	470	535	595	665	x	x	x	x	x	x	x	x	x	
55000	418	421	490	559	625	699	x	x	x	x	x	x	x	x	x	
56000	440	441	516	592	663	x	x	x	x	x	x	x	x	x	x	
57000	461	462	541	624	702	x	x	x	x	x	x	x	x	x	x	
58000																

F4E AIRCRAFT
ALTITUDE-32500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

F4E AIRCRAFT
ALTITUDE-33500. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	DRAG INDEX	90	100	110	120	130	140
30000	1309	1244	1160	1107	1076	1045	1002	948	895	855	834	818	796	757
31000	1289	1224	1143	1091	1060	1029	987	934	882	843	818	796	757	701
32000	1269	1205	1125	1074	1043	1013	972	920	869	830	806	784	746	691
33000	1249	1186	1107	1057	1027	997	956	905	856	818	793	771	735	681
34000	1228	1167	1094	1044	1011	982	942	894	842	805	784	759	723	671
35000	1208	1148	1072	1023	994	966	926	877	829	792	769	747	712	660
36000	1188	1129	1054	1005	97	950	911	863	816	780	756	735	701	650
37000	1168	1110	1037	990	961	934	896	849	803	767	744	723	689	644
38000	1148	1091	1019	973	945	918	881	835	799	754	731	711	678	630
39000	1127	1072	1002	965	939	902	866	821	776	742	719	699	667	620
40000	1107	1053	984	939	912	886	850	806	763	729	707	687	655	594
41000	1087	1034	966	922	895	872	835	792	754	716	694	675	644	599
42000	1067	1015	945	905	873	854	820	778	736	704	682	663	633	573
43000	1047	995	931	889	863	838	805	764	723	691	670	651	621	573
44000	1027	976	913	872	847	822	790	750	710	678	657	639	610	569
45000	1006	957	896	855	834	807	775	735	697	656	636	615	587	538
46000	986	938	878	838	814	791	760	722	683	653	633	615	587	538
47000	966	919	860	821	797	775	745	707	670	641	620	592	570	521
48000	946	900	843	804	781	757	729	693	657	628	608	594	569	521
49000	926	881	825	783	765	743	714	679	647	615	595	575	550	504
50000	906	862	807	771	749	727	699	665	630	605	585	565	540	494
51000	885	843	790	754	732	711	684	651	620	591	562	542	512	470
52000	865	824	772	737	715	695	665	637	609	580	557	538	518	470
53000	845	805	754	720	699	679	654	637	609	580	557	538	518	470
54000	825	785	737	704	683	663	639	614	585	556	537	518	498	470
55000	805	766	719	687	660	647	620	595	565	536	517	498	470	470
56000	784	747	701	670	650	632	605	577	548	520	501	482	463	470
57000	764	729	684	653	633	617	590	562	533	505	486	467	448	470
58000	744	709	666	636	617	595	567	538	509	481	462	443	424	470

F4E AIRCRAFT
ALTITUDE-35000. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	165	163	186	201	207	215	229	251	272	290	304	323	355	397	400
31000	175	174	198	213	221	231	248	273	297	317	332	351	385	433	440
32000	185	185	212	226	235	247	267	295	322	344	360	380	415	464	480
33000	195	196	222	239	249	263	286	317	347	371	388	408	445	497	520
34000	205	207	234	252	263	279	305	339	372	398	416	437	475	531	560
35000	215	218	243	264	277	295	324	362	397	425	444	466	505	564	606
36000	225	230	258	277	291	311	343	384	422	472	494	535	598	640	
37000	235	241	270	290	305	327	362	406	447	479	500	523	565	631	680
38000	245	252	282	303	319	343	381	428	472	500	528	552	595	665	720
39000	255	263	294	315	333	360	401	451	497	533	566	584	622	698	x
40000	265	273	306	329	349	378	422	475	525	567	612	658	734	x	
41000	278	286	321	348	372	405	452	509	563	630	656	704	x		
42000	290	297	336	367	394	430	482	542	595	643	671	699	x		
43000	312	319	355	385	410	456	511	572	636	682	713	x			
44000	314	321	365	403	437	481	540	608	672	721	x				
45000	326	332	379	421	459	506	569	641	709	x	x				
46000	344	349	381	416	491	544	609	663	730	x	x				
47000	359	364	419	470	518	575	643	708	x	x	x				
48000	374	376	437	493	542	607	684	x	x	x	x				
49000	389	392	455	510	572	638	720	x	x	x	x				
50000	404	427	473	538	599	669	x	x	x	x	x	x			
51000	452	453	531	610	680	x	x	x	x	x	x	x	x	x	x
52000	477	477	561	646	x	x	x	x	x	x	x	x	x	x	x
53000	502	501	591	686	x	x	x	x	x	x	x	x	x	x	x
54000	527	525	621	x	x	x	x	x	x	x	x	x	x	x	x
55000	552	549	x	x	x	x	x	x	x	x	x	x	x	x	x
56000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
57000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
58000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

F4E AIRCRAFT
ALTITUDE 35000. FUEL
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DPAG INDEX										90	100	110	120	130	140
	0	10	20	30	40	50	60	70	80	90						
30000	539	544	568	736	774	809	853	912	982	152	1111	1156	1194	1251	1369	
31000	561	626	709	770	811	849	897	959	1032	1105	1167	1217	1263	1330	1454	
32000	583	649	737	763	84	890	940	1006	1082	1158	1223	1278	1331	1408	1539	
33000	605	671	765	837	886	931	984	1053	1132	1211	1284	1359	1431	1487	1624	
34000	626	693	793	870	924	971	1028	1100	1182	1264	1336	1400	1466	1506	1709	
35000	648	716	821	904	961	1012	1072	1147	1232	1316	1392	1461	1538	1644	1794	
36000	670	738	849	937	999	1053	1115	1194	1282	1369	1448	1522	1606	1723	1879	
37000	692	761	877	971	1030	1093	1159	1224	1312	1394	1474	1557	1633	1755	1964	
38000	714	791	911	1007	1076	1138	1211	1298	1394	1484	1577	1670	1788	1952	2155	
39000	736	827	949	1044	1117	1186	1267	1352	1433	1521	1611	1701	1825	2144	x	
40000	758	863	986	1062	1157	1234	1323	1426	1521	1634	1739	1871	2053	2336	x	
41000	797	927	1054	1149	1230	1319	1424	1540	1655	1765	1885	2052	2309	x	x	
42000	824	971	1100	1195	1280	1378	1494	1618	1739	1855	1985	2176	x	x	x	
43000	851	1016	1146	1241	1330	1436	1563	1697	1824	1945	2085	x	x	x	x	
44000	878	1066	1192	1287	1380	1495	1632	1775	1909	2034	x	x	x	x	x	
45000	905	1114	1238	1333	1430	1554	1701	1854	1993	x	x	x	x	x	x	
46000	926	1090	1223	1318	1414	1535	1679	1828	x	x	x	x	x	x	x	
47000	955	1139	1274	1369	1463	1600	1755	1915	x	x	x	x	x	x	x	
48000	985	1236	1325	1426	1526	1654	1832	1968	x	x	x	x	x	x	x	
49000	1015	1285	1427	1522	1633	1729	1908	2098	x	x	x	x	x	x	x	
50000	1089	1497	1552	1649	1773	x	x	x	x	x	x	x	x	x	x	
51000	1132	1477	1628	1722	x	x	x	x	x	x	x	x	x	x	x	
52000	1175	1547	1741	1795	x	x	x	x	x	x	x	x	x	x	x	
53000	1217	1617	1774	x	x	x	x	x	x	x	x	x	x	x	x	
54000	1260	1697	x	x	x	x	x	x	x	x	x	x	x	x	x	
55000			x	x	x	x	x	x	x	x	x	x	x	x	x	
56000			x	x	x	x	x	x	x	x	x	x	x	x	x	
57000			x	x	x	x	x	x	x	x	x	x	x	x	x	
58000			x	x	x	x	x	x	x	x	x	x	x	x	x	

F4E AIRCRAFT
ALTITUDE-35000 FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER LITER POUNDS FUEL.

F4E AIRCRAFT
ALTITUDE 37500 FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX										110	120	130	140
	10	20	30	40	50	60	70	80	90	100				
30000	197	225	242	252	266	291	322	353	377	394	+15	+51	504	529
31000	208	211	238	255	264	284	312	347	381	+17	+25	+85	+42	573
32000	219	223	221	270	283	302	333	371	+09	+37	+56	579	618	
33000	231	236	262	284	299	320	354	396	+36	+67	+88	510	552	662
34000	242	248	273	295	314	338	375	421	+64	+97	+19	572	682	653
35000	253	261	291	313	330	356	396	+02	+92	+27	+55	574	616	691
36000	268	276	309	333	354	384	428	482	533	+71	+96	621	668	
37000	281	288	325	353	377	411	+59	517	572	+13	+40	666	714	
38000	293	301	340	372	400	438	+90	552	610	+54	+64	712	x	
39000	306	313	356	391	423	465	521	587	649	728	x			
40000	319	326	371	411	447	492	552	622	688	738	x			
41000	342	347	398	445	487	539	607	683	x	x	x	x	x	
42000	361	366	421	474	522	580	653	735	x	x	x	x	x	
43000	380	384	444	502	550	620	699	x	x	x	x	x	x	
44000	399	402	467	531	591	660	x	x	x	x	x	x	x	
45000	419	+21	+94	560	625	700	x	x	x	x	x	x	x	
46000	469	+76	+54	636	717	x	x	x	x	x	x	x	x	
47000	494	493	580	673	x	x	x	x	x	x	x	x	x	
48000	516	516	603	x	x	x	x	x	x	x	x	x	x	
49000	542	539	x	x	x	x	x	x	x	x	x	x	x	
50000	566	562	x	x	x	x	x	x	x	x	x	x	x	
51000	x	x	x	x	x	x	x	x	x	x	x	x	x	
52000	x	x	x	x	x	x	x	x	x	x	x	x	x	
53000	x	x	x	x	x	x	x	x	x	x	x	x	x	
54000	x	x	x	x	x	x	x	x	x	x	x	x	x	
55000	x	x	x	x	x	x	x	x	x	x	x	x	x	
56000	x	x	x	x	x	x	x	x	x	x	x	x	x	
57000	x	x	x	x	x	x	x	x	x	x	x	x	x	
58000	x	x	x	x	x	x	x	x	x	x	x	x	x	

F4E AIRCRAFT
ALTITUDE-37500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	10	20	30	40	50	60	70	80	90	100	110	120	130	140	DRAG INDEX	
															0	1000
30000	557	622	703	763	804	841	888	950	1022	1094	1156	1205	1249	1314	140	140
31000	579	645	732	798	843	883	933	998	1073	1149	1214	1267	1320	1395	1525	1525
32000	601	668	761	832	881	925	978	1045	1125	1203	1272	1330	1390	1476	1612	1612
33000	624	691	794	867	922	967	1023	1095	1176	1257	1330	1393	1481	1557	1700	1700
34000	646	714	819	901	958	1008	1068	1143	1228	1312	1387	1426	1532	1637	1707	1707
35000	669	737	848	925	997	1054	1113	1191	1279	1366	1445	1519	1602	1718	x	x
36000	694	762	880	974	1044	1097	1164	1245	1337	1428	1510	1590	1682	x	x	x
37000	718	798	919	1014	1084	1147	1222	1310	1407	1502	1592	1689	1814	x	x	x
38000	742	837	959	1055	1124	1199	1293	1384	1482	1582	1681	1799	x	x	x	x
39000	766	876	1000	1096	1172	1251	1344	1449	1557	1661	1769	x	x	x	x	x
40000	790	915	1041	1135	1216	1303	1405	1519	1632	1744	x	x	x	x	x	x
41000	844	1004	1134	1229	1317	1422	1545	1677	x	x	x	x	x	x	x	x
42000	881	1166	1198	1293	1387	1563	1641	1765	x	x	x	x	x	x	x	x
43000	918	1127	1262	1357	1455	1564	1737	x	x	x	x	x	x	x	x	x
44000	956	1188	1326	1420	1525	1665	x	x	x	x	x	x	x	x	x	x
45000	993	1249	1390	1484	1594	1746	x	x	x	x	x	x	x	x	x	x
46000	973	1217	1350	1450	1558	x	x	x	x	x	x	x	x	x	x	x
47000	1011	1275	1421	1515	x	x	x	x	x	x	x	x	x	x	x	x
48000	1049	1341	1485	x	x	x	x	x	x	x	x	x	x	x	x	x
49000	1087	1403	x	x	x	x	x	x	x	x	x	x	x	x	x	x
50000	1125	1465	x	x	x	x	x	x	x	x	x	x	x	x	x	x
51000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
52000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
53000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
54000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
55000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
56000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
57000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
58000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

F4E AIRCRAFT
ALTITUDE-37500 FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 1.00 POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	DPAQ INDEX	90	100	110	120	130	140
30000	1393	1323	1234	1177	1147	1111	1064	1007	950	908	881	858	816	754
31000	1363	1295	1208	1153	1120	1085	1043	985	931	890	864	840	799	739
32000	1334	1268	1183	1128	1121	1065	1021	966	912	871	846	823	783	724
33000	1305	1240	1157	1104	1073	1042	999	942	893	853	828	805	767	693
34000	1276	1212	1152	1080	1049	1019	977	925	874	835	810	788	750	695
35000	1247	1185	1106	1056	1020	996	955	904	855	817	792	771	734	680
36000	1218	1157	1104	1031	1002	973	933	884	835	798	774	753	717	x
37000	1189	1130	1055	1007	973	950	911	863	816	780	757	736	701	x
38000	1159	1102	1030	983	952	927	890	843	797	762	739	718	x	x
39000	1130	1074	1004	958	931	904	868	823	778	743	721	x	x	x
40000	1101	1047	978	934	907	881	846	802	759	725	x	x	x	x
41000	1072	1019	953	910	883	858	824	782	x	x	x	x	x	x
42000	1043	992	927	885	864	835	802	761	x	x	x	x	x	x
43000	1014	964	902	861	835	812	780	x	x	x	x	x	x	x
44000	985	937	876	837	812	789	x	x	x	x	x	x	x	x
45000	955	909	851	812	789	766	x	x	x	x	x	x	x	x
46000	926	881	825	788	755	x	x	x	x	x	x	x	x	x
47000	897	854	800	764	x	x	x	x	x	x	x	x	x	x
48000	868	826	774	x	x	x	x	x	x	x	x	x	x	x
49000	839	799	x	x	x	x	x	x	x	x	x	x	x	x
50000	810	771	x	x	x	x	x	x	x	x	x	x	x	x
51000	x	x	x	x	x	x	x	x	x	x	x	x	x	x
52000	x	x	x	x	x	x	x	x	x	x	x	x	x	x
53000	x	x	x	x	x	x	x	x	x	x	x	x	x	x
54000	x	x	x	x	x	x	x	x	x	x	x	x	x	x
55000	x	x	x	x	x	x	x	x	x	x	x	x	x	x
56000	x	x	x	x	x	x	x	x	x	x	x	x	x	x
57000	x	x	x	x	x	x	x	x	x	x	x	x	x	x
58000	x	x	x	x	x	x	x	x	x	x	x	x	x	x

F4F AIRCRAFT
ALTITUDE-40000 FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX														
	0	10	20	30	40	50	60	70	80	90					
30000	252	250	291	312	329	356	396	445	491	526	549	573	617	690	X
31000	265	273	305	329	349	378	422	475	525	562	587	612	658	734	X
32000	277	295	321	348	371	404	452	509	562	603	629	650	703	X	
33000	290	297	330	367	394	431	484	543	590	643	672	700	X		
34000	302	319	351	380	412	457	512	577	637	684	714	X			
35000	315	321	365	404	439	483	542	610	675	724	X				
36000	346	352	392	452	492	549	618	696	X	X	X	X			
37000	368	372	430	484	534	594	669	X	X	X	X				
38000	389	393	455	516	573	639	721	X	X	X	X				
39000	411	414	481	549	614	684	X	X	X	X	X				
40000	432	434	507	581	654	729	X	X	X	X	X				
41000	463	482	567	656	X	X	X	X	X	X	X				
42000	519	517	611	X	X	X	X	X	X	X	X				
43000	555	552	X	X	X	X	X	X	X	X	X				
44000	X	X	X	X	X	X	X	X	X	X	X				
45000	95	X	X	X	X	X	X	X	X	X	X				
46000	X	X	X	X	X	X	X	X	X	X	X				
47000	X	X	X	X	X	X	X	X	X	X	X				
48000	X	X	X	X	X	X	X	X	X	X	X				
49000	X	X	X	X	X	X	X	X	X	X	X				
50000	X	X	X	X	X	X	X	X	X	X	X				
51000	X	X	X	X	X	X	X	X	X	X	X				
52000	X	X	X	X	X	X	X	X	X	X	X				
53000	X	X	X	X	X	X	X	X	X	X	X				
54000	X	X	X	X	X	X	X	X	X	X	X				
55000	X	X	X	X	X	X	X	X	X	X	X				
56000	X	X	X	X	X	X	X	X	X	X	X				
57000	X	X	X	X	X	X	X	X	X	X	X				
58000	X	X	X	X	X	X	X	X	X	X	X				

F4E AIRCRAFT
ALTITUDE-40000 FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

F4E AIRCRAFT
ALTITUDE=40000. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	1448	1374	1282	1223	1183	1155	1106	1055	986	943	915	891	874	782	x
31000	1413	1342	1251	1194	1160	1127	1080	1021	963	920	894	874	827	764	x
32000	1378	1306	1220	1165	1132	1099	1053	996	940	908	872	849	807	x	
33000	1342	1275	1190	1135	1103	1071	1027	971	917	876	851	826	x		
34000	1307	1242	1159	1116	1075	1044	1000	947	894	854	829	x	x		
35000	1272	1204	1128	1076	1046	1016	974	922	871	832	x	x			
36000	1237	1175	1097	1047	1017	968	948	897	x	x	x	x	x	x	x
37000	1212	1142	1066	1018	989	939	921	x	x	x	x	x	x	x	x
38000	1166	1109	1036	988	960	933	915	x	x	x	x	x	x	x	x
39000	1131	1075	1005	953	932	905	x	x	x	x	x	x	x	x	x
40000	1096	1042	974	930	903	877	x	x	x	x	x	x	x	x	x
41010	1061	1009	943	900	x	x	x	x	x	x	x	x	x	x	x
42000	1026	975	912	x	x	x	x	x	x	x	x	x	x	x	x
43000	990	942	x	x	x	x	x	x	x	x	x	x	x	x	x
44000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
45000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
46000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
47000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
48000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
49000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
50000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
51000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
52000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
53000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
54000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
55000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
56000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
57000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
58000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

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REFERENCES

1. Technical Order 1A-7D-1, 15 November 1971.
2. Technical Order 1F-4C-1-1, 15 July 1962.
3. Weber, William B., "Effect of External Stores on the Stability, Control, and Drag Characteristics of the McDonnel Douglas F-4 Aircraft." Aircraft/Stores Compatibility Symposium Proceedings, 19 through 21 November 1969. Air Force Armament Laboratory, Eglin Air Force Base, Florida.
4. Gallagher, R. D.; and Jimeney, G.: Technique Development for Predicting External Store Aerodynamic Effects on Aircraft Performance. AFFDL-TR-72-24, Air Force Flight Dynamics Laboratory, Wright-Patterson Air Force Base, Ohio, July 1971.
5. Mathews, Carles B.; Korn, Stephen C.; and Studwell, Victor E.: Evaluation of the Conformal Carriage Concept on the Performance and Basic Static Longitudinal Stability of the F-4E Aircraft. AFATL-TR-71-76, Air Force Armament Laboratory, Eglin Air Force Base, Florida, July 1971.
6. Scarborough, James B.: Numerical Mathematical Analysis. The John Hopkins Press, Baltimore, 1966.

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13. ABSTRACT A computer program using an iterative technique was developed for determining the radius of action of F-4E and A-7D aircraft with any configuration of external stores. The program uses performance data from the aircraft flight manuals to calculate fuel and distance required to achieve military power climbs and optimum cruise fuel consumption. Required inputs to the program include the initial amount of fuel onboard and aircraft gross weight, the cruise and loiter altitudes, and the outbound and returning drag indices due to aerodynamic drag of the external stores. Optional inputs that provide increased accuracy include fuel for engine start and taxi, and fuel and distance for takeoff and descent. The program calculates sequential increments of the outbound cruise portion of the mission profile until the fuel reserve desired at the end of mission (return to home base) is obtained; thus the radius of action is determined.		

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14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Computer Simulation						
Radius of Action						
F-4E Aircraft						
A-7D Aircraft						
External Stores						
Mission Profile						

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